



Chronology of KSC and KSC Related Events for 1995

Ken Nail, Jr.



**CHRONOLOGY OF KSC
AND KSC RELATED EVENTS
FOR 1995**

**BY KEN NAIL, JR.
KSC LIBRARY ARCHIVIST**



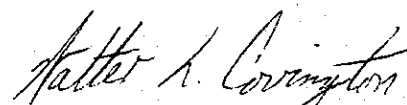
FOREWORD

This 1995 Chronology is published to fulfill the requirements of KMI 2700.1 (as revised) to describe and document KSC's role in NASA's progress.

Materials for this Chronology were selected from a number of published sources. The document records KSC events of interest to historians and other researchers. Arrangement is by date of occurrence, though the source cited may be dated one or more days after the event.

Materials were researched and prepared for publication by Historian-Archivist Ken Nail, Jr. (Sherikon Space Systems, Inc.). For the added convenience of researchers, each entry has been headlined.

Comment on the Chronology should be directed to the John F. Kennedy Space Center, LIBRARY-E, Kennedy Space Center, Florida, 32899. The Historian-Archivist may also be reached by e-mail at Kenneth.Nail-1@kmail.ksc.nasa.gov.



Walter L. Covington
Center Services



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JANUARY

January 4:

SHUTTLE PROCESSING UPDATES

The Space Shuttle **Discovery** (OV-103) continues to undergo processing for STS-63, the first mission of 1995. The Orbiter will rendezvous, but not dock, with the Mir Space Station and, in addition, it will deploy the Spartan experiment and operate Spacehab-3. Tonight technicians in OPF Bay 2 will transfer the vehicle to the Vehicle Assembly Building. While inside the VAB, the 100-ton Orbiter will be bolted to its already stacked solid rocket boosters and external tank. STS-63 work scheduled: rollout to Launch Complex 39B on January 11; undergo the mission's flight readiness review on January 18 and the terminal countdown demonstration test on January 18 and 19. Countdown for the February 2 mission is planned to commence on January 29. Meanwhile, **Endeavour** (OV-105) is in OPF Bay 1 being prepared for its STS-67 mission now set for early March. Testing of the mission's Astro-2 payload is planned for this week. The three main engines are scheduled to be installed next week; the crew equipment interface test is also set for next week. The Orbiter is expected to be rolled over to the VAB by the end of this month. **Atlantis** (OV-104) is being processed in OPF Bay 3 where the vehicle's heat shields are being removed to prepare for removal of the three main engines next week. Fuel cell No. 2 is being replaced this week. Rollover to the Vehicle Assembly Building should occur by mid-April with launch targeted for late May. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 4, 1995.]

January 5:

MIR RENDEZVOUS MISSION

Discovery has been rolled over to the Vehicle Assembly Building; the move was completed at 2:30 a.m. today. The STS-63 crew equipment interface test has been completed as have the payload interface verification checks. Technicians have also completed aft engine compartment closeouts and final engine checks. In the VAB, processing technicians are making preparations to lift the Orbiter and mate it with the external tank tonight. Shuttle interface verification tests have been scheduled. Mission rollout from the VAB will begin at 8:00 a.m. on January 11. **Discovery** will not only rendezvous with Mir, the Russian Space Station, but will also conduct Spartan experiments and operate Spacehab-3. [Banke, **FLORIDA TODAY**, p. 2A, Jan. 5, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 5, 1995.]

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ENDEAVOUR ASTRO-2 INSTALLED

Technicians in OPF Bay 1 have installed the STS-67 mission payload - Astro-2 - and conducted interface verification checks. Main engines No. 1 and 2 have been installed and main propulsion system verification checks have been made. Work in progress today: aft engine compartment closeouts; preparations to install main engine No. 3; water spray boiler checkouts; preparations to replace the right hand orbital maneuvering system pod; Orbiter/payload interface verification test. The mission's crew equipment integration test

is set for January 9. Installation of main engine No. 3 has also been scheduled. STS-67 is planned to commence in early March and last for 15 days, 13 hours; it will carry a crew of 7. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 5, 1995.]

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STS-71: FIRST MIR DOCKING

Atlantis will be the first non-Russian vehicle to dock with the Mir Space Station when it undertakes its STS-71 mission in late May; that flight is planned to last for 9 days and 20 hours. In another first for the Space Transportation System, the Orbiter will take a crew of 7 into space and return to earth with 8 crew members. Technicians in OPF Bay 3 have removed and replaced orbital maneuvering system thrusters; made Orbiter structural checks; off loaded hypergolic reactants; main engine pump torque checks and opened payload bay doors. Today, technicians are conducting main propulsion system verification checks; making preparations to remove the vehicle's main engines and installing Russian-made panels in the Orbiter. The panels are necessary to operate the Orbiter docking device for mating operations with Mir. The installation of the auxiliary power units is scheduled. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 5, 1995.]

January 6:

STS-63: ROLLOVER COMPLETED

The Space Shuttle **Atlantis** has been rolled over to the Vehicle Assembly Building from its processing bay in the OPF. **Atlantis** arrived at 2:30 a.m. yesterday and mating operations begin this morning. Work scheduled on **Atlantis** next week includes: Shuttle interface verification tests; rollout to Launch Complex 39B next Wednesday, January 11; launch pad validations on January 12 and main engine preparations and the frequency response test on January 13. STS-63 mission managers noted key operational milestones for this month: the terminal countdown demonstration test on January 17-19; a flight readiness review on January 18; hot firing of auxiliary power unit No. 2 on January 22 and commencement of the mission countdown at 4 p.m. January 29, looking toward a February 2, 1995, launch at 12:51 a.m. The Mir rendezvous mission will feature a crew of 6 and last for just over 8 days. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 6, 1995.]

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STS-67: MAIN ENGINE INSTALLATION

In OPF Bay 1, technicians readying **Endeavour** for its STS-67 mission have installed main engines 1 and 2; the Astro-2 payload has also been installed and interface verification checks and main propulsion system verification checks have been made. Work in progress today: aft engine compartment closeouts; installation of main engine no. 3; preparations to remove and repair a signal conditioner on the right hand orbital maneuvering system pod; Orbiter/payload interface verification test. Work scheduled for next week includes: a crew equipment integration test on January 9; servicing of

auxiliary power unit No. 1 and beginning of aft engine compartment closeouts. Target dates have been set for key operational milestones scheduled for January; these include: completion of the right hand orbital maneuvering system pod installation on January 18; final payload bay closure, also on the 18th and rollover to the Vehicle Assembly Building. **Endeavour's** STS-67 mission is targeted for early March and planned to last 15 1/2 days with a crew of 7. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 6, 1995.]

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STS-71: RUSSIAN PANELS INSTALLED

Technicians engaged in **Atlantis** processing activities in OPF Bay 3 have installed Russian-made panels in the vehicle; the panels are necessary to operate the Orbiter docking device for mating operations with the Mir Space Station in late May of this year. Today, OPF techs are preparing to remove the vehicle's main engines and conducting main propulsion system verification checks. STS-71 work scheduled for next week: removal of the Space Shuttle main engines; removal and replacement of fuel cell No. 2 and installation of the auxiliary power units on January 16. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 6, 1995.]

January 9:

STS-63: SHUTTLE MATED

Discovery which was rolled over to the VAB on January 6 has now been mated with its external tank and Shuttle interface verification tests will be conducted today. STS-63 work scheduled includes: rollout on January 11; launch pad validations and main engine preparations and the mission's frequency response test. Mission managers continue to point toward these mission milestones: terminal countdown demonstration test; flight readiness review; hot firing of auxiliary power unit No. 2 and commencement of the countdown. Mission managers decided late today to move up the scheduled rollout of **Discovery** to Launch Complex 39B from Wednesday morning (January 11) to Tuesday morning. First motion of the stacked Orbiter from the Vehicle Assembly Building is set for about 11:30 a.m. The earlier rollout was necessitated by a leaking thruster on the right hand OMS pod.

The decision to roll early was made when the pressure in a right hand orbital maneuvering system pod oxidizer manifold dropped from 150 psi to about 15 psi. The manifold serves 4 of the orbital maneuvering system thrusters on the right hand pod. One of these thrusters (R3A) has a "documented very minor leak" which was managed and controlled during the past two flights. However, from the time the Orbiter left the Orbiter Processing Facility on January 5 to the time it was first powered up in the Vehicle Assembly Building, the manifold pressure dropped significantly. Engineers think this radical drop was caused by cold weather effects on the thruster's seal this past weekend. Last night, the manifold pressure was brought up to about 65 psi in the VAB, the maximum available with equipment in the VAB. Once at the pad, the manifold pressure can be returned to the standard 150 psi. Low pressure in the manifold over a period of

time may cause other thruster seals to dry out and leak. Later this week, engineers will decide if thruster R3A needs replacing. Meanwhile, in OPF Bay 1, **Endeavour** continues to undergo processing activities for its March STS-67 mission to conduct Astro-2 experiments. Technicians in the OPF have completed the Orbiter/payload interface verification test; installed main engine No. 3 and conducted main propulsion system verification checks. Today, technicians will conduct a crew equipment integration test; aft engine compartment closeouts; preparations to remove and repair a signal conditioner on the right hand orbital maneuvering system pod. The servicing of auxiliary power unit No. 1 has been scheduled. The Space Shuttle **Atlantis** is also in the OPF - in Bay 3 - where it is being readied for its late May Mir docking STS-71 mission. The installation of Russian-made panels has been completed. Today, technicians will remove Space Shuttle main engines and remove and replace fuel cell No. 2. They will also conduct main propulsion system verification checks. Workers this week will remove and replace six ball screws on the Orbiter docking system (ODS) in the Vehicle Assembly Building. The work will not impact the schedule to install the ODS in **Atlantis**'s payload bay next month. The installation of auxiliary power units into **Atlantis** has also been scheduled. [Halvorson, **FLORIDA TODAY**, p. 1A, Jan. 11, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Jan. 9, 1994; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Jan. 10, 1994.]

January 10:

STS-63: INTERFACE TESTS

Shuttle interface verification tests have been completed on **Discovery** prior to its rollout from the Vehicle Assembly Building for STS-63 about noon today. Launch pad validations are scheduled as are main engine preparations and a frequency response test. In OPF Bay 1, **Endeavour** continues being processed for its March STS-67 mission to deploy the Astro-2 payload. OPF techs have completed the crew equipment integration and Orbiter/payload interface verification tests; installed main engine No. 3 and conducted main propulsion system verification checks. Today, workers will conduct aft engine compartment closeouts and preparations to remove and repair a signal conditioner on the right hand orbital maneuvering system pod. Meanwhile, in OPF Bay 3, technicians are also preparing **Atlantis** for a late May mission, STS-71. This historic mission will feature the first docking of an American Space Shuttle with the Russian Mir Space Station and will last for almost 10 days. Workers have removed and replaced fuel cell No. 2 and removed the main engines. Today, the technicians will conduct main propulsion system verification checks and mechanical hook-ups of fuel cell No. 2. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Jan. 10, 1994.]

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27th ATLAS/INTELSAT LAUNCH

A Martin Marietta Astronautics **Atlas IIAS** successfully launched the INTELSAT 704 communications satellite into geosynchronous transfer orbit early this morning from Launch Complex 36B. It was the first Atlas launch of 1995 and the 27th Atlas/INTELSAT launch. "A successful Atlas launch is a great way to start the new

year," said **Michael R. Wash**, Martin Marietta Commercial Services, Inc. president. "INTELSAT is one of Atlas' long-standing customers, and we intend to continue this excellent relationship and bring them many more successes." The Atlas IIAS, designated AC-113, is the highest performing variant of the Atlas family presently launching satellites for domestic and international customers. It incorporates four Thiokol Castor IVA solid rocket boosters, which increase the total thrust of the launch vehicle to 620,500 pounds. Atlas IIAS is capable of placing satellites in the 7,000 to 8,000 pound weight class into geosynchronous transfer orbit. INTELSAT 704 is the third of INTELSAT's newest generation of spacecraft to be deployed in the Asia-Pacific region. It will bring INTELSAT's in-orbit fleet to a total of 23 satellites providing broadcasting, telephone and other business services to its global network serving more than 200 countries and territories. This new generation of INTELSAT satellites spurred development of the Atlas IIAS to meet the performance objectives required by the VII series. [Martin Marietta Release #005, Jan. 10, 1995; Halvorson, FLORIDA TODAY, p. 2A, Jan. 11, 1995.]

January 11:

STS-63: LEAKING THRUSTER DECISION

Following **Discovery's** rollout to Launch Complex 39B yesterday, mission managers decided to proceed with plans to replace the leaking thruster on the right hand orbital maneuvering system pod. To accommodate the replacement operation, the helium signature test, originally scheduled for January 17 will moved up 24 hours and the thruster work will take place on that date. Work to replace the thruster should be complete prior to the terminal countdown demonstration test scheduled for January 17-18. If all goes according to plan, there will be no further changes to the schedule and launch will remain targeted for February 2. Workers today are conducting the solid rocket booster part of the Shuttle interface verification test. In addition, they are securing auxiliary power unit No. 2 and conducting launch pad validations. Scheduled for January 13 are main engine preparations and a frequency response test. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 11, 1995.]

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STS-67/STS-71 PROCESSING ACTIVITIES

The STS-67 crew equipment integration test has been completed on **Endeavour** which continues to undergo processing in OPF Bay 1. Work in progress: aft engine compartment closeouts; securing of main engine No. 3 following its installation; payload end-to-end tests; preparations to remove and repair a signal conditioner on the right hand orbital maneuvering system pod. The OMS pod conditioner will be removed and repaired on January 16. The Space Shuttle **Atlantis** has had its No. 2 fuel cell removed and replaced and its main engines replaced. Today, OPF technicians are making main propulsion system verification checks; fuel cell No. 2 functional checks and are removing auxiliary power units. When the Orbiter is rolled over to the VAB, workers there will remove and replace six ball screw housings on the Orbiter docking system (ODS). [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 11, 1995.]

January 12:

STS-63: DISCOVERY POWERED UP

At Launch Complex 39B, **Discovery** has been powered up; auxiliary power unit No. 2 has been secured and launch pad validations have been completed. Work in progress today in behalf of the STS-63 mission: solid rocket booster partition of the flight readiness test and the Shuttle interface verification test. STS-63 work scheduled: main engine frequency response test and the launch readiness review tomorrow and the removal of a leaking thruster on January 17. The February 2 mission will rendezvous with the Russian Mir Space Station; the Orbiter is also carrying the Spacehab-3 module and the Spartan experiments. The eight day mission will conclude February 10 with a landing at Kennedy Space Center at 7:05 a.m. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 12, 1995.]

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STS-67/STS-71 UPDATES

Main engine No. 3 has been secured following its installation into **Endeavour** in OPF Bay 1. In addition, technicians have completed payload end-to-end tests for Astro-2 which is the prime payload of **Endeavour's** March STS-67 mission. In process today: aft engine compartment closeouts and preparations to remove a signal conditioner on the right hand orbital maneuvering system pod; the removal of the pod is scheduled for January 16. In OPF Bay 3, technicians have completed fuel cell No. 2 functional checks and removal of the three main engines from **Atlantis** as part of the pre-flight processing of the Orbiter for STS-71. Work in progress today: removal and replacement of six ball screw housings on the Orbiter docking system (ODS); main propulsion system verification checks and removal of auxiliary power units. Scheduled activity includes the reconfiguration of the payload bay for installing ODS next month. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 12, 1995.]

January 13:

STS-63: IVT COMPLETED

The Shuttle interface verification test and the solid rocket booster portion of the flight readiness test have been completed at Launch Complex 39B in preparation for **Discovery's** STS-63 liftoff on February 2. Work in progress: main engine frequency response test; launch readiness review and securing of auxiliary power unit No. 2. STS-63 work scheduled for next week: helium signature leak test; removal of leaking thruster R3A; flight readiness review; crew arrival for the terminal countdown demonstration test followed by the test itself and the pre-launch hypergolic propellant loading. APU No. 2 will be hot fired on January 22. The mission countdown begins at 4:30 p.m. January 29 and the crew arrives for launch at midnight January 29. The mission, which will carry a crew of 6, will rendezvous with the Mir Space Station, deploy the Spartan experiment platform and utilize SPACEHAB-3. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 13, 1995.]

STS-67: PAYLOAD END-TO-END TESTS FINISHED

Technicians have completed the payload end-to-end tests for **Endeavour's** STS-67 mission. The tests and the installation of the Orbiter's main engine number 3 were accomplished during pre-rollover processing activities in OPF Bay 1. Tasks in process today include: aft engine compartment closeouts; preparations to remove and repair a signal conditioner and final payload bay cleaning. The right hand OMS pod will be removed and repaired January 16 and, on January 18, the payload bay doors will be closed finally. In OPF Bay 3 nearby, **Atlantis** is being readied for its May STS-71 mission. The APUs have been removed and fuel cell No. 2 has undergone functional checks. Work in progress today: removal and replacement of six ball screw housings on the Orbiter docking system and main propulsion system leak and functional checks. Work will begin next week to reconfigure the payload bay for ODS installation in February. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 13, 1995.]

January 17:

PERSONNEL CHANGES

Kennedy Space Center Director **Robert L. Crippen** announced today the following key personnel changes, effective January 22. **Robert B. Sieck**, KSC's Shuttle Launch Director, has been named Director, Shuttle Management and Operations, a position being vacated by **Jay Honeycutt** who will become KSC's sixth Center Director on January 21. Sieck will be responsible for the management and technical direction of the Shuttle Program at KSC. **James F. Harrington, III**, Director, Safety and Reliability for KSC, will become the new Shuttle Launch Director. Harrington's first mission to serve as the Launch Director will be Mission STS-63. In making the announcement, Crippen praised both men both men for their long years of contributions to the Shuttle Program. "Bob Sieck has been a keystone of the Shuttle launch team while serving as Launch Director. Jim Harrington has had a less visible role but has been a key manager in preparing all the elements needed for safe and successful flights."

Sieck has served as Deputy Director of Shuttle Management and Operations since 1992. A NASA veteran since 1994, Sieck joined the agency at KSC as a Gemini spacecraft systems engineer and subsequently worked as an engineer on the Apollo Program. He served as a Shuttle Orbiter project engineer during the Shuttle design phase and was the Engineering Manager for the Shuttle Approach and Landing Tests at Dryden Flight Research Facility in California during the mid-1970s. Returning to KSC he filled successive positions of responsibility in engineering and operations management until his assignment as Shuttle Launch Director in 1986, Sieck has served as Launch Director for a total of 52 of the 66 Space Shuttle launches. He has a bachelor's degree in electrical engineering from the University of Virginia.

Harrington has served in his current position in Safety and Reliability since February 1994. Prior to that time, he served as Director, Shuttle Operations since 1988 and as Deputy Director since 1986. Harrington joined the NASA team in 1966 as Senior Test

Supervisor on Apollo 6, 9, 12 and 15. He has served as Operations Chief for the Atlas Centaur Expendable Launch Vehicle Program; Branch Chief of Orbiter/External Tank processing; and as Ground Operations Manager for the first Shuttle missions. He served as a Shuttle Flow Director from 1983-1986. Harrington received a bachelor's degree in electrical engineering from the University of Miami, FL. [Halvorson, FLORIDA TODAY, p. 1A, Jan. 18, 1995; NASA/KSC News Release No. 2-95, Jan. 17, 1995.]

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FIRST 1995 SHUTTLE LAUNCH

NASA managers today set February 2, 1995, as the official launch date for Space Shuttle **Discovery** on Mission STS-63. The date assumes successful completion of thruster changeout work scheduled to be finished later this week. The flight will feature a rendezvous with the Russian Space Station Mir in a dress rehearsal of missions that will follow later in 1995. In addition, the mission will see the third flight of the commercial SPACEHAB facility in which a number of microgravity research experiments will be conducted. **Discovery's** crew also will deploy and retrieve a free-flyer astronomy payload and two crewmembers will perform a five-hour spacewalk. Launch of **Discovery** on February 2 is currently planned for approximately 12:49 a.m. EST from Kennedy Space Center's Launch Complex 39B. The actual launch time is expected to vary by several minutes based on new Mir state vectors for Shuttle rendezvous phasing requirements which will be updated closer to launch. The available window to launch **Discovery** is approximately 5 minutes each day. The STS-63 mission is scheduled to last just over 8 days. A 12:49 a.m. launch on February 2 would produce a landing at Kennedy Space Center's Shuttle Landing Facility on February 10 at approximately 6:15 a.m. EST. The STS-63 crew will be commanded by **James D. Wetherbee** who will be making his third Shuttle flight. **Eileen M. Collins** will serve as pilot. She will be making her first spaceflight, becoming the first woman to pilot a Space Shuttle. The four STS-63 mission specialists aboard **Discovery** will include **Bernard A. Harris, Jr.**, the STS-63 Payload Commander and Mission Specialist-1 who will be making his second flight; **Michael C. Foale**, Mission Specialist-2 who will be making his third flight; **Janice Voss**, Mission Specialist-3 who will be making her second flight; and Cosmonaut **Vladimir Georgivich Titov**, Mission Specialist-4, who will be making his first flight aboard the Space Shuttle and fourth flight into space. [Note to Editors: N95-4, Jan. 18, 1995.]

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STS-63: THRUSTER DECISION IMMINENT

Workers replace **Discovery's** thruster R3A yesterday. During operations to repressurize the manifold, another thruster on that same manifold, R3R, was determined to be leaking also. Managers will decide today whether to replace R3R. Work in progress today: the mission's terminal countdown demonstration test; mission flight readiness review and securing and leak checks on auxiliary power unit no. 2. A leaking seal on the fuel inlet filter quick disconnect on auxiliary power unit no. 2 will be replaced tonight. The pre-launch hypergolic propellant load is scheduled. Target dates for key operational milestones scheduled for this month include: hot fire of auxiliary power unit no. 2 on

January 22; start of the countdown at 4:30 p.m. on January 29 and crew arrival for launch at midnight on January 29. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 18, 1995.]

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STS-67 & STS-71 PREPARATIONS

Preparations of **Endeavour** for its March STS-67 mission continue in OPF Bay 1. Technicians have removed and repaired the vehicle's signal conditioner on the right hand orbital maneuvering system pod and completed auxiliary power unit No. 1 connections. Work in progress today includes: reinstallation of the right hand OMS pod; aft engine compartment closeouts and final payload bay cleaning and closeouts. The STS-67 mission will carry the Astro-2 payload into space. Meanwhile in OPF Bay 3, technicians there are continuing to prepare **Atlantis** for the first ever Shuttle docking with the Mir Space Station. A number of processing activities have been completed recently: removal and replacement of six ball screw housings on the orbiter docking system (ODS) in the VAB; removal in the OPF of auxiliary power units and fuel cell No. 2 functional checks. Today, OPF techs will make main propulsion system leak and functional checks and install auxiliary power units. On the processing schedule: a docking system functional test and the reconfiguration of the **Atlantis** payload bay for ODS installation in February. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 18, 1995.]

January 19:

STS-63: THRUSTERS REPLACED

Workers preparing **Discovery** for its February 2 STS-63 launch have today replaced both leaking thrusters (R3A and R3R) and leak checks are complete and good. Managers are now confident **Discovery's** reaction control system is tight and leak free. Also, the faulty seal and quick disconnect on auxiliary power unit No. 2 was successfully replaced. Following yesterday's flight readiness review, managers picked February 2 as the firm launch date for the first Shuttle mission of 1995. In addition to the completion of the FRR and the removal and replacement of thrusters, technicians at Launch Complex 39B also finished securing and leak checks on auxiliary power unit No. 2. Today, the mission's terminal countdown demonstration test was begun. The mission's key operational milestones (with target dates) are: pre-launch hypergolic propellant load (January 21); hot firing of auxiliary power unit No. 2 (January 23); ordnance installation and hypergolic propellant pressurization (January 26); installation and checkout of spacesuits (January 27); complete orbiter aft engine compartment closeouts (January 29); commencement of the countdown (January 29); crew arrival for launch (January 29, midnight). [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 19, 1995.]

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STS-67: OMS POD MATING

The Space Shuttle **Endeavour**, in OPF Bay 1, is being readied for its March 2 STS-67 mission. Technicians in the bay have removed and repaired a signal conditioner on the

vehicle's right hand orbital maneuvering system pod. Today, OPF techs will implement the electronic and mechanical mating of the right hand orbital maneuvering system pod; conduct aft engine compartment closeouts and final payload bay cleaning and closeouts and making landing gear functional checks. Final closure of the payload bay doors for flight is set for tomorrow. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 19, 1995.]

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STS-71: PROCESSING ACTIVITIES

Technicians in OPF Bay 3 are processing the Space Shuttle **Atlantis** for its May/June STS-71 mission; it will be the first Shuttle mission to dock with the Russian Space Station Mir. Ball screw housing work on the Orbiter docking system (ODS) has been completed and today's processing activities include: main propulsion system leak and functional checks; installing auxiliary power units and conducting orbital maneuvering system functional tests. A docking system functional test has been scheduled as has the reconfiguration of the payload bay for the installation of the ODS next month. The STS-71 mission will last for nearly 10 days and involve seven crewmembers for the flight up to the Mir; eight crewmembers will ride **Atlantis** back to a Kennedy Space Center landing after 9 days and 20 hours. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 19, 1995.]

January 20:

STS-63: THRUSTERS CHECKED

The STS-63 mission's terminal countdown demonstration test [TCDT] has now been completed as has been the removal, replacement and leak check of thrusters R3A and R3R. Today, workers at Launch Complex 39B are making preparations to load hypergolic propellants onboard **Discovery** and complete closeouts of the solid rocket boosters. Key operational milestones (target dates only): pre-launch hypergolic propellant load (January 21); hot firing of auxiliary power unit No. 2 (January 23); ordnance installation and hypergolic propellant pressurization (January 26); installation and checkout of spacesuits (January 27); completion of Orbiter aft compartment closeouts (January 29); commencement of the countdown (4:30 p.m., January 29) and crew arrival (midnight, January 29). [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 20, 1995].

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STS-67, 71 PROCESSING ACTIVITIES

Final payload bay cleaning and closure of the bays doors has been accomplished by the processing technicians preparing **Endeavour** for the STS-67 mission. The OPF techs have also made landing gear functional checks. Work in progress today: electrical and mechanical mating of the right hand orbital maneuvering system pod and closeouts of the Orbiter's midbody and aft engine compartment. Over in OPF Bay 3, technicians are preparing **Atlantis** for the historic STS-71 mission during which the Orbiter will dock with the Russian Space Station Mir in a first for the Space Shuttle Program. Work in

progress on **Atlantis** for STS-71: Ku-band antenna testing; orbital maneuvering system functional tests; configuring the midbody for the Orbiter docking system (ODS). STS-71 tasks scheduled: functional tests of the auxiliary power units next week; docking system functional test and reconfiguration of the payload bay for ODS installation next month. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 20, 1995].

January 23:

STS-63: HYPERGOLIC PROPELLANTS LOADED

Workers at Launch Complex 39B are preparing **Discovery** for its STS-63 mission on February 2; they have now completed loading hypergolic propellants aboard **Discovery**. Work in progress today: hot firing of auxiliary power unit (APU) No. 2 for about 7 minutes; rotating the service structure back around the vehicle after the APU hot firing; closeouts of the solid rocket boosters. Key operational milestones: ordnance installation and hypergolic propellant pressurization; installation and checkout of spacesuits; purges of the external tank; complete orbiter aft engine compartment closeouts; commencement of the countdown and crew arrival. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 23, 1995.]

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STS-67: PROCESSING UPDATE

Endeavour thruster L5D on the left orbital maneuvering system pod has been removed by OPF Bay 1 technicians who are processing the vehicle for its upcoming STS-67 mission. Today, workers will closeout the Orbiter's midbody and aft engine compartment, remove the payload bay door strongbacks and conduct tests of the external tank door seals. STS-67 processing activities scheduled: tests of the Orbiter's flight controls and main propulsion system thrust vector control system; tests of the orbital maneuvering and reaction control systems. The STS-67 mission is planned to launch on March 2 at approximately 1:37 a.m. during a 2 1/2 hour launch window. The mission is scheduled to last 15 days and 13 hours. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 23, 1995.]

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STS-71: FIRST MIR DOCKING

The STS-71 mission of **Atlantis** will be the first Space Shuttle flight to dock with the Russian Space Station Mir; launch is expected to occur in the May/June time frame. The mission is to last just under 10 days and will carry an initial crew of seven; it will return to a Kennedy Space Center landing carrying a crew of eight. An American astronaut has been selected to spend some time aboard the Mir. STS-71 processing activities today include: a Mini-Crew Equipment Interface Test with the Orbiter docking system (ODS); tests of the main propulsion system; Ku-band antenna testing; orbital maneuvering system functional tests; configuring the midbody for the Orbiter docking system and functional tests of the auxiliary power units. The ODS is expected to be installed in February. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 23, 1995.]

January 24: STS-63: SERVICE STRUCTURE SURROUNDS ORBITER

Workers at Launch Complex 39B have rotated the pad service structure back around **Discovery** which is due to launch on its STS-63 mission on February 2. APU No. 2 has also been hot fired, a procedure which took about seven minutes. Processing activities underway today include: closeouts of the solid rocket boosters; loading the Orbiter's mass memory units with software; preparations to install ordnance devices; launch countdown preparations; preparations to begin closing out the Orbiter's aft compartment for flight; preparations to begin stowage into the SPACEHAB module. Key operational milestones (with target dates): ordnance installation (January 25); hypergolic propellant pressurization (January 26); installation and checkout of Spacesuits (January 27); purges of the external tank; complete Orbiter aft engine compartment closeouts (January 29); commencement of the countdown and astronaut arrival (January 29). [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 24, 1995.]

0 STS-67/STS-71 LAUNCH PREPARATIONS

Endeavour is being readied for its March STS-67 mission in Orbiter Processing Facility Bay 1. Today's processing activities include: closeouts of the Orbiter's midbody and aft engine compartment; preparations to service the ammonia system; leak tests of the forward reaction control system; checks of the orbital maneuvering system and reaction control system electrical circuits. Rollover from the OPF to the Vehicle Assembly Building is targeted for January 31. Technicians processing **Atlantis** for its STS-71 mission - Mir Docking - have completed the Mini-Crew Equipment Interface Test with the Orbiter docking system (ODS). Work in progress today: repositioning of the waste water dump nozzle; tests of the main propulsion system; Ku-band antenna testing; orbital maneuvering system functional tests; configuring the midbody for the orbiter docking system and functional tests of the auxiliary power units. Testing of the hydraulic landing gear has been scheduled as has the reconfiguration of the payload bay for next month's installation of the ODS. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 24, 1995.]

January 25: STS-63: MMU'S LOADED

Technicians at Launch Complex 39B have completed loading **Discovery's** mass memory units - computers - with software. APU No. 2 has also been hot fired. Today's pre-launch activities in behalf of the STS-63 include: closeouts of the solid rocket boosters; preparations to install ordnance devices; launch countdown preparations; closing out the Orbiter's aft compartment for flight and stowing experiments and equipment into the SPACEHAB module. Milestones (with target dates) include: ordnance installation (tonight); hypergolic propellant pressurization (January 26); installation and checkout of spacesuits (January 26); purges of the external tank (January 27); complete Orbiter aft engine compartment closeouts (January 29). The countdown for STS 63 will begin at 4:30 p.m. on January 29; the astronaut crew of 6 will arrive at midnight on the 29th.

Mission duration is planned for 8 days, 5 hours and 22 minutes. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 25, 1995.]

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STS-67: ASTRO-2

The Space Shuttle **Endeavour** continues to undergo STS-67 processing activities in Orbiter Processing Facility Bay 1; launch is targeted for March 2 at 1:37 a.m. In Bay 1 today, technicians will conduct checks of the Orbiter body flap; closeout the Orbiter's midbody and aft engine compartment; servicing the Orbiter's ammonia system; leak tests of the forward reaction control system and checks of the orbital maneuvering system and reaction control system electrical circuits. Rollover for **Endeavour** to the Vehicle Assembly Building is set for midnight on January 31. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 25, 1995.]

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STS-71: DOCKING MISSION

In OPF Bay 3, technicians are preparing **Atlantis** for its June STS-71 mission, the first Shuttle flight to dock with the Mir Space Station. Today's processing tasks include: servicing the Orbiter's potable water system; repositioning the waste water dump nozzle; tests of the main propulsion system; Ku-band antenna testing; orbital maneuvering system

functional tests; configuring the midbody for the orbiter docking system (ODS). Installation of the docking module will take place in February. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 25, 1995.]

January 26:

STS-63: ORDNANCE DEVICES INSTALLED

Technicians preparing **Discovery** for its STS-63 mission have installed ordnance devices and completed the initial stowage of experiments and equipment into the SPACEHAB module. Work in progress today: closeouts of the solid rocket boosters; launch countdown preparations; closeouts of the Orbiter's aft compartment for flight and the installation and checkout of the two contingency spacesuits in the Orbiter's airlock. The spacesuit installation occurs tonight. Countdown to launch begins at 4:30 p.m. on January 29 looking toward a 12:48 a.m. liftoff on February 2 at the start of a five-minute launch window. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 26, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 27, 1995.]

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OPF: ENDEAVOUR, ATLANTIS UPDATES

In Orbiter Processing Facility Bay 1, the Space Shuttle **Endeavour** is being prepared for its STS-67 flight on which it will deploy the ASTRO-2 payload. In Bay 1, today's OV-105 processing activities include: checks of the body flap; closeouts of the Orbiter's midbody and aft engine compartment; leak tests of the forward reaction control system;

closeouts of the orbital maneuvering system pods; installation of various panels on the vehicle; checks of the flight controls and main propulsion system thrust vector control system and a frequency response test of the Orbiter's aerosurfaces. **Endeavour** has been scheduled to undergo structural leak tests and a positive pressure test. In OPF Bay 3, **Endeavour's** sister ship, **Atlantis**, is being readied for its June STS-71 mission. On that mission **Atlantis** will dock with the Russian Mir Space Station, the first such international docking mission since 1975 and the Apollo Soyuz Test Project. The auxiliary power units have been installed. Today, technicians are doing systems testing of the power reactant storage and distribution (PRSD) system. They will also be servicing the Orbiter's potable water system; repositioning of the waste water dump nozzle; conducting tests of the main propulsion system and Ku-band antenna; orbital maneuvering system functional tests and configuring the midbody for the installation in February of the Orbiter docking system (ODS). [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 26, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 27, 1995.]

January 27:

STS-75: CREW SELECTED FOR TSS MISSION

Marine Corps Lt. Col. **Andrew M. Allen** will command Space Shuttle **Columbia's** STS-75 mission in early 1996 -- the second flight of the Tethered Satellite System (TSS). This flight also marks the third devoted to orbital investigations using the United States Microgravity Payload (USMP). Joining Allen are Air Force Major **Scott Horowitz**, Pilot; Payload Commander **Franklin R. Chang-Diaz**; Italian Space Agency (ASI) TSS Payload Specialist **Umberto Guidoni**; Mission Specialist **Jeffrey A. Hoffman**; and European Space Agency Mission Specialists **Claude Nicollier** and **Maurizio Cheli** from Italy. Four of the seven crew members flew on STS-46 in July/August 1992 - the first TSS mission during which the satellite was deployed to a distance of about 900 feet (274 meters) from the Shuttle. The TSS Project is a joint NASA/ASI effort managed by the Marshall Space Flight Center (Huntsville, AL). On STS-75, the five-foot diameter (1.6 meter) Italian-built satellite is scheduled to be deployed on the end of a 13-mile long (20 kilometer) conductive tether to study the electrodynamic effects of moving such a tether through the Earth's magnetic field. The experiment also will test techniques for managing the tethered spacecraft at great distances. Throughout the 13-day flight, additional experiments housed in the Orbiter's payload bay will permit scientists access to space for microgravity and fundamental science investigations. The USMP is designed to provide the foundation for advanced scientific investigations similar to those planned aboard the International Space Station.

Allen, 39, flew on STS-46 and STS-62 in March 1994. He received a bachelor of science degree in mechanical engineering from Villanova University in 1977. Allen was born in Philadelphia, PA. Horowitz, 37, is a member of the astronaut class of 1992 and will be making his first Shuttle flight. His master of science and doctorate degrees in aerospace engineering were earned from Georgia Institute of Technology in 1979 and 1982, respectively. While born in Philadelphia, he considers Thousand Oaks, CA, his

hometown. Chang-Diaz will be flying on his fifth Shuttle mission. He was a Mission Specialist on STS 61-C in January 1986, STS-34 in October 1989, STS-46, and STS-60 in February 1994. His doctorate in applied plasma physics from the Massachusetts Institute of Technology was awarded in 1977. Chang-Diaz, 44, was born in San Jose, Costa Rica. Guidoni, 40, was born in Rome, Italy, and holds a bachelor of science degree in physics and a Ph.D. in astrophysics from the University of Rome. He was the alternate payload specialist on the first TSS flight and is a co-investigator on the Research in Electrodynamic Tether Effects (RETE) experiment scheduled during the mission. STS-75 will be his first Shuttle mission. Hoffman, 50, will be making his fifth Shuttle flight. His previous space flight experience includes STS 51-D in April 1985, STS-35 in December 1990, STS-46 and STS-61 in December 1993. His doctorate in Astrophysics was obtained from Harvard University in 1971. Hoffman was born in Brooklyn, NY, but considers Scarsdale, NY, his hometown. Nicollier, 50, has flown twice previously on the Shuttle - STS-46 and STS-61, in December 1993. He earned his master of science degree in astrophysics from the University of Geneva in 1975. Nicollier was born in Vevey, Switzerland. Cheli, 35, is a member of the astronaut class of 1992 and will be making his first Shuttle flight. He studied geophysics at the University of Rome in 1989 and received a master of science in aerospace engineering from the University of Houston. Cheli was born in Modena, Italy. [NASA/KSC News Releases No. 95-9, Jan. 27, 1995.]

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STS-63: LAUNCH COUNTDOWN

The countdown for launch of the Space Shuttle **Discovery** on mission STS-63 is scheduled to begin Sunday, Jan. 29, at 4:30 p.m. EST, at the T-43 hour mark. The countdown includes 37 hours and 15 minutes of built-in hold time leading to the opening of the launch window at approximately 12:48 a.m. (EST) on February 2. The launch window extends for five minutes. The exact time of launch will be determined about 90 minutes before liftoff based on the location of the Mir Space Station. The launch of **Discovery** marks the beginning of the first mission to Russia's Mir. A rendezvous with the Space Station is scheduled for day four of the flight. Though **Discovery** will only come within about 38 feet of the station, this flight will set the stage for seven planned docking missions between the Orbiter and Mir, the first of which is currently scheduled for early this summer. In order to accommodate the short five minute window necessary to rendezvous with Mir, several changes have been made to the launch countdown. Most significant is the addition of an extra 30 minutes built into the hold at T-9 minutes. STS-63 is the first of eight missions now scheduled for 1995. This will be the 20th flight of the Shuttle **Discovery** and the 67th flight overall in NASA's Space Shuttle Program. The primary payloads of mission STS-63 are the SPARTAN-204 free-flyer and Spacehab-3. SPARTAN (Shuttle Pointed Autonomous Research Tool for Astronomy) will be deployed on flight day 5 and retrieved 48 hours later for return to Earth. SPARTAN consists of instruments for celestial observations. Also located in the payload bay is the Orbital Debris Radar Calibration Sphere-2 (ODERACS-2) experiment, in which calibration targets ranging from two to six inches in diameter will be ejected from the payload bay and tracked by ground-based radar and telescopes.

Discovery was rolled out of Orbiter Processing Facility Bay 2 on January 5 and mated with the external tank and solid rocket boosters in the Vehicle Assembly Building. The Shuttle stack was then transported to Launch Complex 39B on January 10. **Discovery** last flew in September 1994. The STS-63 crew are: Commander **James Wetherbee**, Pilot **Eileen Collins**, Mission Specialists **Bernard Harris**, **Michael Foale** and **Janice Voss**; and Russian cosmonaut **Vladimir Titov**. Collins will be the first female to pilot a Space Shuttle flight. The crew is scheduled to arrive at Kennedy Space Center at about 12 midnight Sunday evening, January 29. Their activities at KSC prior to launch will include equipment fit checks, medical examinations and opportunities to fly in the Shuttle Training Aircraft. As the countdown begins, the KSC launch team in Firing Room 3 of the Launch Control Center will verify all systems to assure the Shuttle is properly powered up and the data processing and backup flight control systems are operating trouble-free. Verifications conducted throughout the launch countdown ensure continuous reviews are made of the flight software stored in the Orbiter's twin memory banks. Computer-controlled display systems will be activated and the backup flight system general purpose computer will be loaded. Operations will also begin to prepare the Orbiter for on-board cryogenic loading. Later, Orbiter navigation aids will be turned on and tested and the inertial measurement units activated. Ground crews will make the final storage of mid-deck and flight deck supplies, perform microbial samplings of the flight crew's drinking water and check water levels in the waste management system. At T-27 hours, the countdown enters its first scheduled hold. This is a four hour hold lasting from 8:30 a.m. to 12:30 p.m. Monday (January 30). When the countdown resumes, the launch pad will be cleared of all personnel for loading cryogenic reactants into the power reactant storage and distribution system cells to provide electricity to the Orbiter and drinking water for the crew. Cryogenic flow operations are scheduled to start at about 12:30 p.m. Monday and continue for about 7 hours.

As servicing of the cryogenic tanks is completed, the clock will enter an eight-hour built-in hold at the T-19 hour mark. This hold will last from 8:30 p.m. Monday to 4:30 a.m. Tuesday. Following cryogenic loading operations, the pad will be re-opened for scheduled pre-launch activities. The Orbiter mid-body umbilical unit, used to load the super-cold reactants in the Orbiter's fuel cell tanks, will be demated and retracted into the launch structure. When the countdown resumes, technicians will complete final vehicle and facility closeouts and begin configuring **Discovery's** cockpit for flight. The Orbiter's flight control system and navigation aids will be activated. The stowable crew seats will be installed in the flight and mid-decks. The countdown will enter another built-in hold at the T-11 hour mark at 12:30 p.m. Tuesday [January 31]. This 20-hour, 25-minute hold will last until 8:55 a.m. Wednesday [February 1]. During this hold, time critical equipment will be installed in the Orbiter's cockpit. The inertial measurement units and the Orbiter's communications systems will be activated. At about 8 a.m. Wednesday, the Rotating Service Structure is scheduled to be moved away from the vehicle and placed in launch position. At T-9 hours (10:55 a.m. Wednesday), the onboard fuel cells will be activated. At T-8 hours, the launch team will evacuate the blast danger area and clear the pad for loading the external tank with the cryogenic propellants for the Orbiter's main

engines. At T-7 hours, 30 minutes, conditioned air that is flowing through the Orbiter's payload bay and other areas on the Orbiter will be switched to gaseous nitrogen in preparation for fueling the external tank. The inertial measurement units will transition from the warm-up stage to the operate/attitude determination mode at T-6 hours, 45 minutes. The countdown will enter another planned built-in hold at the T-6 hour mark at 1:55 p.m. Wednesday. During this two-hour hold, final preparations for loading the external tank will be completed. Also, a pre-tanking weather briefing will be conducted for the benefit of the Mission Management Team prior to their giving approval to begin tanking operations. Chilledown of the lines that carry the cryogenic propellants to the external tank begins when the clock starts counting again at 3:55 p.m. Wednesday. Filling and topping off the external tank should be complete about three hours later at the beginning of the next planned hold at T-3 hours, or 6:55 p.m. Wednesday. During the two-hour hold at the T-3 hour mark, the Final Inspection Team (formerly known as the Ice and Debris Inspection Team) will conduct a final survey of the pad and various Shuttle components ensuring their readiness for flight. Also, the closeout crew will be dispatched to the pad and begin configuring the crew module and white room for the flight crew's arrival. Liquid oxygen and liquid hydrogen will be in a stable replenish mode during this time to replace any propellant that "boils" off.

The six flight crew members will be awakened at about 7:30 p.m. Wednesday and seated for their final meal before launch at about 8 p.m. Following their meal, the crew will receive a briefing on weather conditions at KSC and at the TransAtlantic Abort Landing (TAL) sites. The flight crew will suit-up in their partial-pressure suits, then leave the Operations and Checkout Building at about 9 p.m. Wednesday. They will arrive at the Pad 39B white room at about 9:30 p.m. where they will be assisted into the crew cabin by white room personnel. Just prior to the T-60 minute mark, the test team and the flight crew will get another weather update, including observations from astronaut **Robert Cabana** flying in a Shuttle Training Aircraft in the KSC area. The next built-in hold occurs at the T-20 minute mark (11:35 p.m. Wednesday) and lasts for 10 minutes. The final built-in hold occurs at the T-9 minute mark (11:56 p.m.) This hold usually extends for 10 minutes, however, due to the short 5 minute launch window necessary to rendezvous with Mir, the planned hold has been extended to 40 minutes. Based on the Mir orbit, the exact launch time will be adjusted and the hold will be extended or shortened as necessary. This adjustment will not be more than a few minutes. During the final hold at T-9 minutes, the flight crew and ground team receive the NASA launch director's and the mission management team's final "go" for launch. Milestones after the T-9 minute mark include start of the ground launch sequencer; retraction of the Orbiter access arm at T-7 minutes, 30 seconds; start of the Orbiter's auxiliary power units at T-5 minutes; pressurization of the liquid oxygen tank inside the external tank at T-2 minutes, 55 seconds; pressurization of the liquid hydrogen tank at T-1 minute, 57 seconds; ground power disconnection from the Orbiter at T-50 seconds; and the electronic "go" to **Discovery's** onboard computers to start their own terminal countdown sequence at T-31 seconds. The Orbiter's three main engines will start at T-6.6 seconds. [NASA/KSC News Releases No. 6-95, Jan. 27, 1995.]

January 29:

STS-63: PAYLOADS STATUS

The Spacehab module is scheduled to be powered up for launch at 2 a.m. Tuesday morning. Loading of the time-critical Spacehab experiments will begin that evening at 6:30 p.m. and will take about twelve hours to complete. Nine time-critical mid-deck experiments are scheduled to be installed on Wednesday morning starting at about 2:45 a.m. This activity will take approximately 5 hours to complete. A final hour starting at 11:45 a.m. will complete the activity. **Discovery** will also deploy the Spartan 204 experiments. [**PAYLOAD STATUS REPORT**, Jan. 29, 1995.]

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ASTRO-2 UPDATE

The interface verification test (IVT) between Astro-2 and **Endeavour** was performed on January 5-6. This verified proper connections between the payload and the Orbiter and that the Astro-2 instruments were operating correctly. An end-to-end communications test was successfully performed on January 11. This test verified the communications links between Astro-2 in **Endeavour's** payload bay, the MILA tracking station at Kennedy Space Center, control facilities at the Johnson Space Center and the Marshall Spaceflight Center and the Tracking and Data Relay Satellite System. **Endeavour** is scheduled to be transported to the Vehicle Assembly Building February 3 and the rollout to Launch Complex 39A is planned for February 8. Once at the pad final pre-launch preparations will be performed to the Hopkins Ultraviolet Telescope (HUT) and the Ultraviolet Imaging Telescope (UIT) before the payload bay doors are closed for flight on February 24. [**PAYLOAD STATUS REPORT**, Jan. 29, 1995.]

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SPACELAB-MIR: STS-71/Atlantis

Experiment racks were installed into the Spacelab module on January 13. Since that time work to establish the electrical connections has been underway. An interface verification test [IVT] to verify those connections is scheduled for February 6. Also in work is the installation of the high data rate recorders and video tape recorders. Spacelab will be installed tomorrow, Tuesday, January 31. [**PAYLOAD STATUS REPORT**, Jan. 29, 1995.]

January 30:

STS 63: MISSION STATUS REPORT

The countdown for the STS-63 mission began yesterday at 4:30 p.m. at the T-43 hour mark for a planned launch of Space Shuttle **Discovery** at about 12:48 a.m. February 2 [Thursday]. The countdown will target launch for 12:45 a.m., the earliest possible launch opportunity based on the Mir orbit. The exact launch time will be adjusted at the T-9 minute hold. The weather forecast indicates no chance of weather prohibiting launch on Thursday morning. Orbiter aft engine closeouts have been completed; the spacesuits have been installed and checked; the aft engine compartment has been closed out and the external tank has been purged. The crew arrived at 11:40 p.m. Sunday. Today, STS-63

pad workers will conduct pyrotechnic initiator controller tests; begin the stowage of flight crew equipment; begin final stowage setups of Spacehab experiments and have begun the seven-hour operation to load cryogenic reactants into **Discovery's** fuel cell storage tanks. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 30, 1995.]

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STS-63: WEATHER LOOKS PERFECT FOR LAUNCH

"It looks like, from the weather perspective, that NASA's timing for this launch [STS-63] is perfect," said **Ed Prisela**, Shuttle weather officer for the 45th Weather Squadron at Cape Canaveral Air Station. Launch is set for 12:48 a.m. on February 2 and conditions are expected to be 100% favorable for liftoff during the five minute window. **Discovery's** STS-63 Commander **James Wetherbee** said, "It costs a lot of money to go into space, and so we try to optimize our time and do many things." No precipitation is expected and there are no other weather concerns. [Banke, **FLORIDA TODAY**, p. 1A, Jan. 31, 1995; STS-63 LAUNCH WEATHER OUTLOOK, Jan. 30, 1995.]

January 31:

STS-63: COUNTDOWN CONTINUES

The countdown for mission STS-63 and the launch of **Discovery** Thursday morning continues as planned today. The countdown began Sunday at 4:30 p.m. at the T-43 hour mark. The pad was cleared yesterday for loading the onboard cryogenic tanks with the liquid hydrogen and liquid oxygen reactants. Reactant loading was concluded yesterday evening. The reactants will provide electricity for the Orbiter and crew while in space and drinking water as a by-product during their 8-day mission. After the cryogenics were loaded, the Orbiter's mid-body umbilical unit was demated and retracted into the fixed service structure. Final vehicle and facility closeouts are now underway and the Orbiter's communications systems and inertial measurement units are being activated today. Final Spacehab stowage will be completed later today. Tomorrow, preparations will be made to retract the rotating service structure to launch position at about 8 a.m. Loading of the external tank with cryogenic propellants is scheduled to begin at about 3:55 p.m. Wednesday. Air Force weather forecasters are currently indicating a zero percent probability of weather prohibiting launch on Thursday. During Thursday's five minute launch window, the winds at Pad B are expected to be from the west at 10-15 knots; temperature 48 degrees F; visibility 7 miles; and clouds scattered at 25,000-28,000 feet. The 24-hour-delay forecast reveals similar conditions with forecasters again listing a zero percent chance of violation. The six-member astronaut crew arrived at KSC's Shuttle Landing Facility at about 11:40 p.m. Sunday [January 29]. Today the astronauts will be involved with checking out their mission plans, fit checks of their equipment and flights in the Shuttle Training Aircraft. Launch of Space Shuttle **Discovery** remains set for about 12:48 a.m., Thursday, February 2. The countdown will target launch for 12:45 a.m., the earliest possible launch opportunity based on the Mir orbit. The exact launch time will

be adjusted at the T-9 minute hold. The STS-63 crew includes: Commander **James Wetherbee**; Pilot **Eileen Collins**; Mission Specialists: **Bernard Harris**, **Michael Foale**, **Janice Voss** and **Vladimir Titov**. **[KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Jan. 31, 1995.]**

FEBRUARY

February 1:

STS-63: COUNTDOWN CONTINUES SMOOTH

The countdown for **Discovery's** STS-63 mission and its launch tomorrow morning at 12:48 continues as planned today. No technical issues are being worked by the management team and no problems are being reported from the pad. The rotating service structure was moved into launch position at about 8:00 a.m. this morning. Other operations today include: activating the fuel cells, performance of the pre-ingress switch list, configuration of communications at mission control in Houston and clearing the pad for external tank loading. Loading of the external tank with cryogenic propellants is scheduled to begin at about 3:55 p.m. Air Force weather forecasters are currently indicating a zero percent probability of weather prohibiting launch on Thursday. During Thursday's five minute launch window, the winds at Pad B are expected to be from the 74 west at 10-15 knots; temperature 48 degrees Fahrenheit; visibility 7 miles; and clouds scattered at 25,000-28,000 feet. The 24-hour-delay forecast reveals similar conditions with forecasters again listing a zero percent chance of violation. Today, the six member astronaut crew will be given a briefing on tomorrow morning's launch weather outlook at Kennedy Space Center and the TransAtlantic Abort Sites in Spain and Africa. Also today, the crew will make last minute adjustments to their flight plans while completing their review of launch day activities. Tonight, the crew will depart for Launch Complex 39B at about 9:00 p.m. The crew includes: Commander **James Wetherbee**, Pilot **Eileen Collins**, and Mission Specialists: **Bernard Harris**, **Michael Foale**, **Janice Voss** and Cosmonaut **Vladimir Titov**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 1, 1995.]

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STS-63: LAUNCH POSTPONEMENT

Shuttle managers decided at 3:00 p.m. today to postpone the launch of STS-63 for 24 hours to allow for the replacement of inertial measurement unit No. 2. At about 1:30 this afternoon, the unit failed during its normal launch countdown power-up phase. There are no technical problems with the other two IMUs. The No. 2 Shuttle navigational unit is located in the Orbiter's mid-deck and replacement is expected to be completed later this evening. The IMU's, called HAINS models, are made by Singer Electronics Systems Division (Little Falls, NJ). An IMU is about 9 inches high, 8.5 inches wide and 22 inches long. It weighs about 43.5 pounds. About 8 of the mid-deck lockers containing time-critical experiments will be removed and replaced tomorrow morning. The countdown will be recycled to the T-11 hour mark and will lead up to a planned liftoff at 12:21 a.m. EST. The exact launch time will be known about 90 minutes before launch and will be adjusted at the T-9 minute hold. Weather conditions at KSC are forecast to be favorable for launch on Friday morning with a 100 percent chance of having acceptable conditions. Conditions are also forecast to be favorable for a Friday night/Saturday morning launch attempt. Loading of the external tank with cryogenic propellants is scheduled to begin at about 3 p.m. Thursday. The six-member astronaut

crew [SEE story above] will continue sleeping until their scheduled wake-up time at about 7:30 p.m. this evening. They will have some additional free time and will follow the normal L-1 day schedule of activities. They will be briefed concerning the details of replacing IMU. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 1, 1995.]

February 3:

STS-63 LATE, BUT LAUNCHED

The countdown for launch of **Discovery** on mission STS-63 proceeded smoothly today with liftoff occurring at 12:22:04 a.m. EST from KSC's Launch Complex 39B. No technical issues were worked during the final phase of the count. Commander **James Wetherbee** said, earlier in the week, "We've waited a long time for this. The world has waited even longer. We are bringing together the space programs of the two largest nations in the world." Post launch inspections of the pad revealed no unusual damage to the pad surface or the mobile launcher platform. The solid rocket booster retrieval ships reached the spent boosters shortly after splashdown and were on station until first light when recovery operations began. The STS-63 crew includes: Commander James Wetherbee, Pilot **Eileen Collins** and Mission Specialists: **Bernard Harris**, **Michael Foale**, **Janice Voss** and **Vladimir Titov**. [Halvorson, **FLORIDA TODAY**, p. 1A, Feb. 3, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 3, 1995.]

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STS-67: ROLLOVER TO VAB

The Space Shuttle **Endeavour** [OV-105] was rolled over to the Vehicle Assembly Building this morning at 2:15. Other completed tasks include: final closure of the payload bay doors; orbiter midbody closeouts; aft engine compartment closeouts; frequency response test. Today, workers are lifting the Orbiter and mating it to its mission external tank. **Endeavour** will rollout to LC 39A on February 8; auxiliary power unit No. 1 will be hot-wired on February 9; the terminal countdown demonstration occurs on February 14-15; the payload bay doors will be closed for flight on February 24 and the STS-67 launch is targeted to occur March 2. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 3, 1995.]

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STS-71: ATLANTIS PROCESSING UPDATE

Atlantis remains in OPF Bay 3 where it is being prepared for its STS-71 mission in June. The mission will mark the first time America's Space Shuttle will have docked with the Russian Space Station Mir. The vehicle's auxiliary power units have been installed. Today, OPF technicians will conduct main propulsion system leak and functional checks and implementing orbital maneuvering system tests. Work scheduled for next week includes: auxiliary power unit service and checkouts; external tank door functional checks; deservicing of freon coolant loops. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 3, 1995.]

February 7:

STS-67: ENDEAVOUR PROCESSING

Propulsion engineers will meet today to discuss whether it will be necessary to changeout thruster R3A; if it becomes necessary, the change will be made at the pad without impact to the launch date. **Endeavour** was rolled over to the Vehicle Assembly Building on February 3 where it was mated to the external tank and solid rocket booster stack. The Shuttle interface test is currently underway in the VAB. Rollout to Launch Complex 39A is planned for today at 8:00 a.m. Tomorrow auxiliary power unit No. 1 will be hot-fired. The STS-67 terminal countdown demonstration test is scheduled for February 14-15, with a flight readiness review to follow the completion of the TCDT. The payload bay doors of **Endeavour** will be closed for flight on February 24. Meanwhile, in OPF Bay 3, **Atlantis** continues to undergo leak and functional testing of its auxiliary power units. In the Operations and Checkout Building, the interface verification test (IVT) between the Spacelab-Mir experiment racks and the Spacelab module begin today and will continue through the remainder of the week. [SPACE SHUTTLE STATUS REPORT, Feb. 7, 1995.]

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UPCOMING SHUTTLE MISSIONS

MISSION NUMBER	LAUNCH DATE	PRIME PAYLOAD
STS-67 [Endeavour]	March 2, 1995	Astro-2
STS-71 [Atlantis]	May 24, 1995	1st Mir Docking
STS-70 [Discovery]	June 22, 1995	TDRS-G
STS-69 [Endeavour]	July 20, 1995	WSF-2 SPARTAN 201-3
STS-73 [Columbia]	September 21, 1995	USML-2
STS-74 [Atlantis]	October 26, 1995	2nd Mir Docking
STS-72 [Endeavour]	To Be Determined	SFU-RETR OAST-FLYER
STS-75 [Columbia]	To Be Determined	TSS-1R USMP-03

[Buckingham, Upcoming Shuttle Missions, Jan. 27, 1995.]

February 8:

STS-63: BOTH SRBS HOME AGAIN

Both solid rocket boosters used to launch **Discovery** on its STS-63 mission are home again at Hangar AF and Marshall Space Flight Center engineers are assessing damage to the frustums and forward skirts. Both boosters sustained some damage from water impact loads due to high seas. **Discovery** is currently in day six of its eight-day mission. The crew includes: Commander **James Wetherbee**, Pilot **Eileen Collins** and Mission Specialists: **Bernard Harris**, **Michael Foale**, **Janice Voss** and **Vladimir Titov**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 8, 1995.]

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STS-67: ROLLOUT TO LC 39A

The Space Shuttle **Endeavour** [OV-105] is on its way to Launch Complex 39A. First movement of the stacked Shuttle upon the crawler transporter came at 7:44 this morning. Thruster R3A was repressurized prior to rollout and is currently holding pressure. Once at the pad, the manifold will be brought up to flight pressure (250 psi) and rechecked for leaks. Upcoming operational milestones: hot firing of auxiliary power unit no. 1 at 4 a.m. Thursday, February 9; terminal countdown demonstration test on February 14-15; closing of the payload bay doors for flight on February 24; and targeted launch on March 2. The launch date will be set officially at the end of the TCDT and flight readiness review. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 8, 1995; Halvorson, FLORIDA TODAY, p. 2A, Feb. 8, 1995.]

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STS-71: MIR DOCKING MISSION ON COURSE TO LAUNCH

Processing for **Atlantis'** June STS-71 mission continues in Orbiter Processing Facility Bay 3. Technicians in the OPF Bay have completed external tank door functional checks; deserviced the Freon coolant loops; conducted orbital maneuvering system functional checks and installed auxiliary power units. Today's tasks include: preparations to remove and replace the Freon/water interchanger; conduct APU service and checkouts and make main propulsion system leak and functional checks. The removal and replacement of the Freon/water interchanger has been scheduled. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 8, 1995.]

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NASA/RUSSIAN AGREEMENT

NASA and the Russian Space Agency (RSA) have signed a protocol complementing an agreement reached between Lockheed Missiles & Space Co. and Russia's State Research and Production Space Center (Khrunichev) for the U.S. purchase of the Russian Functional Energy Block (FGB). The FGB will be launched in November 1997 as the first element of the International Space Station. The protocol, signed February 5 in Houston by **Randy Brinkley**, NASA's Space Station Program Manager, and **Boris D. Ostroumov**, the Russian Space Agency's Deputy, Piloted Space Flight, reflects acceptance by the two space agencies of contract terms negotiated by Lockheed and Khrunichev.

The NASA/RSA protocol also guarantees, with no additional cost to NASA, the launch of the FGB on a Russian Proton booster, and navigational control in orbit and related engineering, integration, logistics, maintenance and training support for the FGB. The Lockheed agreement with Khrunichev, a subcontract to NASA's prime Space Station contractor, Boeing, calls for the design, development, manufacturing, test and delivery of the FGB at a price of \$190 million. After initial use as a propulsion module, the FGB will serve as a fuel storage module and a service area, which will provide living and experimentation space as well as backup guidance, navigation and control. In addition, the FGB will serve as an integral part of the Space Station's overall power and information subsystems. Under the agreement, Khrunichev will supply one flight-ready FGB. The agreement also calls for on-orbit operation and performance verification of the GB, as well as transportation prior to launch between Khrunichev production facility and the launch complex at Baikonur, Kazakhstan. In a related agreement, NASA and the RSA on February 6 signed a protocol establishing a liaison office in Houston to support the U.S. - Russian human space flight program. NASA maintains a similar technical liaison office in Moscow. [NASA/KSC News Release No. 95-13, Feb. 8, 1995.]

February 9:

STS-63: MISSION NEARS COMPLETION

There is one landing opportunity at Kennedy Space Center on Saturday [February 11] at 6:51 a.m. EST. There are two Edward Air Force Base landing opportunities on that date: at 6:43 a.m. and 8:20 a.m. EST. Saturday's landing forecast includes a weak high pressure system centered south of Cape Canaveral which will influence space center weather. On Sunday, an approaching cold front will bring increasing winds and cloudiness with a chance of showers. The crew aboard **Discovery** includes: Commander **James Wetherbee**, Pilot **Eileen Collins** and Mission Specialists: **Bernard Harris**, **Michael Foale**, **Janice Voss** and **Vladimir Titov**. Meanwhile, at Kennedy Space Center, the Space Shuttle **Endeavour** was rolled out to the LC 39A pad yesterday and was hard-down on the pad at 2:05 p.m. as the processing activities for the vehicle's STS-67 mission continued. The hot firing test of auxiliary power unit No. 1 was successfully and favorably completed. Today, pad technicians are evaluating thruster R3A for possible replacement, making preparations for the main engine flight readiness test and conducting pre-launch propellant load operations. Key operational milestones for STS-67: main engine flight readiness test; crew arrival for the terminal countdown demonstration test; helium signature leak test; flight readiness review; implementation of the terminal countdown demonstration test; pre-launch propellant load; closing of the payload bay doors for flight; commencement of the countdown on February 27 looking toward a March 2 launch at approximately 1:37 a.m. EST. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 9, 1995; STS-63 Landing Weather Forecast, Feb. 11, 1995.]

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STS-71: LEAK AND FUNCTIONAL TESTS

In OPF Bay 3, **Atlantis** is being processed for its historic June STS-71 mission during which it will dock with the Russian **Mir** Space Station. Technicians in the OPF have

completed their main propulsion system leak and functional checks and have deserviced the Freon coolant loops. Today, processing tasks include: external tank door functional checks; preparations to remove and replace the Freon/water interchanger and implement auxiliary power unit service and checkouts. Key operational milestones which have been targeted for the near term include: installation of the STS-71 main engines on February 20; installation of the Orbiter docking system on March 13 and installation of the Spacelab module on March 17. The crew for the STS-71 docking mission includes: Commander **Robert Gibson**, Pilot **Charles J. Precourt**, Mission Specialists: **Ellen S. Baker**, **Gregory J. Harbaugh**, **Bonnie J. Dunbar** and **Norman E. Thagard**. Cosmonaut crewmembers include: **Anatoly Solovyev**, **Vladimir Dezhurov** and **Gennady Strekelov**. Launch Commentator for the mission will be **Bruce Buckingham**, KSC Public Affairs. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 9, 1995; UPCOMING SPACE SHUTTLE MISSIONS, Jan. 27, 1995.]

February 10:

STS-63: LANDING

The Space Shuttle **Discovery** [OV-103] is scheduled to land at Kennedy Space Center on Saturday, February 11, at 6:51 a.m. EST, completing its STS-63 mission which was launched from KSC on February 3. Landing at KSC's Shuttle Landing Facility (SLF) is slated to occur on orbit 129 at mission elapsed time of 8 days, 6 hours, 29 minutes. De-orbit burn will occur on orbit 128 at about 5:47 a.m. Saturday. There is only one landing opportunity at KSC tomorrow. Two landing opportunities are available Saturday at Edwards Air Force Base, CA, at 6:43 a.m. and 8:19 a.m. EST. The landing of **Discovery** will mark the 22nd landing at KSC in the history of Space Shuttle flight. It will be the first KSC landing this year and the first to occur on the newly resurfaced runway. The surface was modified over the summer in an effort to reduce wear and tear on Orbiter tires during landing and to increase crosswind tolerances. The crew includes: Commander: **James Wetherbee**, Pilot **Eileen Collins**, and Mission Specialists: **Bernard Harris**, **Michael Foale**, **Janice Voss** and **Vladimir Titov**. [NASA/KSC Release No. 8-95, Feb. 10, 1995.]

NO.	MISSION	ORBITER	DATE
1.	41-B	Challenger	February 11, 1984
2.	41-G	Challenger	October 13, 1994
3.	51-A	Discovery	November 16, 1984
4.	51-C	Discovery	January 27, 1985
5.	51-D	Discovery	April 19, 1985
6.	STS-38	Atlantis	November 20, 1990
7.	STS-39	Discovery	May 6, 1991
8.	STS-43	Atlantis	August 11, 1991
9.	STS-45	Atlantis	April 2, 1992
10.	STS-50	Columbia	July 9, 1992
11.	STS-46	Atlantis	August 8, 1992
12.	STS-47	Endeavour	September 18, 1992
13.	STS-52	Columbia	November 1, 1992
14.	STS-54	Endeavour	January 19, 1993
15.	STS-56	Discovery	April 17, 1993
16.	STS-57	Endeavour	July 1, 1993
17.	STS-51	Discovery	September 22, 1993
18.	STS-61	Endeavour	December 13, 1993
19.	STS-60	Discovery	February 11, 1994
20.	STS-62	Columbia	March 18, 1994
21.	STS-65	Columbia	July 23, 1994
22.	STS-63	Discovery	February 11, 1995

[NASA/KSC Release No: 8-95, Feb. 10, 1995.]

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STS-67: THRUSTER EXAMINATION

Endeavour's thruster [R3A] has been examined at Launch Complex 39A and the results indicate that the thruster is "good for flight" and will not be replaced. Today, pad

technicians will conduct the mission's main engine flight readiness test and make pre-launch propellant load preparations. STS-67 work scheduled for next week: crew arrival for the terminal countdown demonstration test [TCDT]; the helium signature leak test; a flight readiness review; the TCDT and pre-launch propellant load. The seven-member crew includes: Commander **Stephen Oswald**, Pilot **William Gregory**, Payload Commander **Tamara Jernigan** and Mission Specialists **John Grunsfeld**, **Wendy Lawrence**, Payload Specialists: **Samuel Durrance** and **Ronald Parise**. The mission is scheduled for more than 15 days, setting a new Space Shuttle flight record. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 10, 1995 and UPCOMING SPACE SHUTTLE MISSIONS, Jan. 27, 1995.]

February 11:

DISCOVERY LANDS AT KSC

The Space Shuttle **Discovery** landed this morning at Kennedy Space Center; the vehicle touched down on the Shuttle Landing Facility at 6:50 a.m. EST on orbit 130. The last landing at KSC was **Columbia's** at the conclusion of its STS-65 mission on July 23, 1994. The crew of STS-63 included Commander **James Wetherbee**, Pilot **Eileen Collins** and Mission Specialists: **Bernard Harris**, **Janice Voss**, **Michael Foale** and Cosmonaut **Vladimir Titov**. **Discovery** was towed to Orbiter Processing Facility Bay 2 in mid-afternoon following de-stow [removal] of the Spacelab experiments. In the OPF, the onboard cryogenic tanks were deserviced and technicians gained access to the aft engine compartment. Tomorrow, the payload bay doors will be open and preparations made to remove the Spacehab and SPARTAN payloads early next week. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 11, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 13, 1995.]

February 12:

STS-67: ENDEAVOUR NEXT

Processing technicians are readying the Space Shuttle **Endeavour** for its upcoming STS-67 mission on March 2. The 16-day mission will be the lengthiest of any so far and will break **Columbia's** 1994 record. The STS-67 payload will include Astro-2 which features three telescopes, i.e., the Hopkins Ultraviolet Telescope, Ultraviolet Imaging Telescope and the Wisconsin Ultraviolet Photo-Polarimeter Experiment. The complement of telescopes first flew on **Columbia** in 1990. The seven-member crew of **Endeavour** travels to Kennedy Space Center this week to take part in the mission's terminal countdown demonstration test. [Banke, FLORIDA TODAY, p. 3A, Feb. 13, 1995.]

February 13:

STS-67: CREW ARRIVAL

The STS-67 terminal countdown demonstration test for **Endeavour's** March 2 launch takes place today; the crew arrived yesterday afternoon. Today, **Endeavour** is undergoing preparations for the helium signature leak checks of the main propulsion system on Tuesday and preparations for the loading of hypergolic fuels on Thursday, February 16. The launch readiness review will be held this afternoon at Kennedy Space Center and

the flight readiness review will be held tomorrow morning. The flight readiness test of the main engines has been completed along with a hot firing of auxiliary power unit No. 1. The STS-67 crew includes: Commander **Stephen Oswald**, Pilot **William Gregory**, Payload Commander **Tamara Jernigan** and Mission Specialists **John Grunsfeld**, **Wendy Lawrence**, **Samuel Durrance** and **Ronald Parise**. Endeavour's primary payload is the ASTRO-2 which is actually comprised of three telescopes. The mission itself is scheduled for more than 15 days and will set a new Shuttle endurance record. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 13, 1995.]

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STS-71: FREON/WATER INTERCHANGER REPLACEMENT

The Freon/water interchanger which provides cooling for the crew compartment and associated electronics will be removed for inspections and replaced. "This interchanger is very, very critical. Without it you're not going anywhere because you don't have cooling. We really don't understand what caused this thing to bulge, so after lots of discussions and hand-wringing, we decided the prudent thing to do would be to change it out," said **Conrad Nagel**, NASA manager in charge of preparing **Atlantis** for STS-71. No impact to the overall schedule for STS-71 is expected, according to KSC spokesman **Bruce Buckingham**. In addition to the air conditioning work, Launch Complex 39A workers are preparing to install the tunnel adapter, drag chute, and main engines and, in the VAB, will begin stacking the solid rocket boosters in High Bay 1. Completed tasks include: external tank door functional checks; deservicing of the Freon coolant loops; orbital maneuvering system functional tests and the installation of auxiliary power units. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 13, 1995; Halvorson, **FLORIDA TODAY**, p. 6A, Feb. 14, 1995.]

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NASA INSTITUTES HIRING FREEZE

NASA has announced a hiring freeze and a halt to upper-management promotions in order to comply with \$5 billion in budget cuts over the next five years. Administrator **Daniel S. Goldin** was told by members of the House Subcommittee on Space that he must "hurry and draft a plan to absorb the cuts proposed by the Clinton Administration." Subcommittee Chairman Rep. **George Sensenbrenner** (R-WI) said, "We're not waiting for NASA to do the restructuring at its pace." He added that "unless NASA tells us what they're doing to meet the president's recommendations" his committee would draft its own plan. Administrator Goldin said, "We're still trying to react to the [president's budget] announcement. We just don't have the answers." [Eisler, **FLORIDA TODAY**, p. 1A, Feb. 14, 1995.]

February 14:

CIVIL SERVICE BUYOUT TO NET 212

Kennedy Space Center has 2,361 civil servants on its payroll today; by April there will be at least 9% fewer, or 212 NASA employees. Officials at the space center say that workers will be offered up to \$25,000 to leave the agency by March 31. The buyout,

second in two years, is part of a plan to survive expected cuts in the NASA budget of \$5 billion over the next five years. Workers already eligible for retirement will be given priority and many will accept them because of the future prospect of a reduction in force or layoffs as non-civil servants call the elimination of jobs. That possibility was raised recently by NASA Administrator **Daniel S. Goldin**. Buyouts are being offered to more than 1,850 civil servants across NASA. These cuts and others are part of the Clinton Administration's efforts to cut the federal work force by 272,000 before the end of the decade. [Halvorson, **FLORIDA TODAY**, p. , Feb. 15, 1995; Borenstein, **THE ORLANDO SENTINEL**, May 20, 1995.]

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PAYLOADS UPDATES

STS-67: Astro-2 ---- Preparations are beginning for the final closeout operations of Astro-2 scheduled for March 23. These activities include removing the protective covers from the telescopes, loading the Ultraviolet Imaging Telescope with film, removing the witness mirrors used for contamination monitoring, and removing red tag items, the ground support hardware not intended for flight. The closeout activities are scheduled to take about 16 hours. On February 24 the payload bay doors will be closed for launch.

STS-71: Spacelab/Mir ---- The Spacelab Interface Verification Test between the experiment racks and the Spacelab long module has been completed. The high data rate recorder will be installed on Wednesday and tested on Thursday. Also to be installed tomorrow in the center aisle of the Spacelab will be the ergometer and treadmill. The Integrated Compatibility Test is scheduled for Feb. 27 which is a final systems and experiment verification test. The Crew Equipment Interface Test, the astronaut familiarization and inspection of the Spacelab-Mir module is scheduled for the following day, February 28.

STS-63: Spacehab/Spartan-204 --- The Spacehab de-stow of the non-time critical experiments is scheduled for February 15. The removal of the Spacehab module and the Spartan 204 from **Discovery's** payload bay is scheduled for February 20.

Meanwhile, the GOES-J weather satellite is scheduled to arrive by airplane at the Shuttle Landing Facility on February 22 and will be taken to the Astrotech commercial spacecraft processing facility in Titusville. The Atlas 1 launch vehicle which will deliver the satellite to space is expected to arrive at Cape Canaveral on April 4. The launch is planned to occur on May 19. [**KSC PAYLOAD STATUS REPORT**, Feb. 14, 1995.]

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STS-67: CREW AT KSC FOR TCDT

The seven-member crew for mission STS-67 is at Kennedy Space Center for the terminal countdown demonstration test which is being held today and tomorrow. The T-0 is planned for 11 a.m. Wednesday [February 15]. The launch readiness review was held

yesterday at KSC and the flight readiness review will be held on Wednesday beginning at 10:00 a.m. Work in progress today: helium signature test; terminal countdown demonstration test; preparations to load the hypergolic fuels. Key operational milestones for **Endeavour's** pre-launch processing include: loading hypergolic fuels; beginning the Orbiter aft engine compartment closeouts for flight; closing the payload bay doors for flight; beginning the countdown for launch and the launch itself on March 2. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 14, 1995.]

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STS-71: 1ST MIR DOCKING

Atlantis remains in Orbiter Processing Facility Bay 3 where it is being processed for its historic Mir docking mission, STS-71; the launch is targeted for late May or early June. Completed processing tasks include: external tank door functional checks; deservicing of the Freon coolant loops; orbital maneuvering system functional tests; installation of the auxiliary power units. Work in progress: removal and replacement of the Freon/water interchanger; tunnel adapter installation preparations; installation of the vehicle's drag chute; preparations to install the main engines; installation of the main landing gear wheel and tire assemblies and commencement of stacking of the solid rocket boosters in the Vehicle Assembly Building High Bay 1. Key operational milestones: installation of main engines on February 20; installation of the Orbiter docking system (ODS) on March 13; installation of Spacelab on March 17; crew equipment interface test on April 11; final payload bay closure on April 12 and rollover to the VAB on April 18. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 14, 1995.]

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STS-70: TDRS-G

As post-flight inspections continue on **Discovery**, engineers noted the total number of Orbiter thermal protection system debris hits was average (125) and the number of hits 1-inch or larger (14) was less than average when compared to previous missions. Today, **Discovery's** payload bay doors will be re-opened and preparations made to remove the Spacehab and SPARTAN payloads early next week. **Discovery** ended its STS-63 mission with a morning landing at the Shuttle Landing Facility on February 11. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 15, 1995.]

February 15:

STS-67: TCDT IN PROGRESS

Endeavour's seven-member crew for the STS-67 mission is at Kennedy Space Center for the terminal countdown demonstration test which concludes today. The flight readiness test (FRT) is also being held today at the space center. A firm launch date is expected to be announced following this afternoon's FRT. A helium signature test has been concluded at Launch Complex 39A and pad technicians are today conducting the TCDT and making preparations to load hypergolic fuels. The flight readiness review is

underway. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 15, 1995.]

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STS-71: DOCKING MISSION PROCESSING UPDATE

The drag chute has been installed in the Space Shuttle **Atlantis** as part of the processing work for the vehicle's upcoming STS-7 mission. Work in progress: remove and replace the Freon/water interchanger; tunnel adapter installation preparations; preparations to install the mission's main engines; installation of main landing gear wheel and tire assemblies; stacking of solid rocket boosters in the Vehicle Assembly Building High Bay 1. Operational milestones: installation of the main engines; installation of the Orbiter docking system (ODS); installation of Spacelab module; crew equipment interface test; final payload bay closure and rollover to the Vehicle Assembly Building. Meanwhile, **Discovery's** payload bay doors were opened and functional checks performed when the vehicle was returned to the OPF Bay 2 following its STS-63 landing on February 11. In the OPF today, technicians are working on the post-flight toxic vapor checks near and around the auxiliary power units and making a final retrieval of the Spacehab experiments. Removal of the Spacelab and SPARTAN payloads has been scheduled as has been the removal of the STS-63 main engines [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 15, 1995.]

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STS-67: MARCH 2 LAUNCH

NASA managers today set March 2, 1995, as the launch date for STS-67, the second Space Shuttle mission of 1995. **Endeavour** will launch the second flight of the ASTRO payload, a cluster of unique telescopes in the Shuttle's payload bay which will turn **Endeavour** into an ultraviolet observatory. The set of mechanized "eyes" will give astronomers a view of the heavens impossible to obtain from the ground. Liftoff for the Orbiter is expected to be at 1:37 a.m. EST from Launch Complex 39A. **Endeavour's** flight is planned to be the longest mission ever flown by a Shuttle crew with a mission duration of 15 days, 13 hours, 32 minutes. Landing at Kennedy Space Center's Shuttle Landing Facility is planned for March 17 at 3:09 p.m. EST. The STS-67 mission will be commanded by **Stephen S. Oswald**. The pilot will be **William G. Gregory**; Mission Specialists include: **John M. Grunsfeld**, **Wendy B. Lawrence** and **Tamara E. Jernigan**. Completing the STS-71 crew will be two payload specialists who flew with ASTRO on its first mission in December 1990 -- **Samuel Durrance** and **Ronald Parise**. STS-67 will be the 8th flight of **Endeavour** and the 68th flight of the Space Transportation System. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 15, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 16, 1995.]

February 16:

KSC: ENGINEERING SUPPORT SHEARED

New Kennedy Space Center Director **Jay Honeycutt** announced today that KSC has decided not to award a follow-on contract for engineering support to the Safety

Reliability and Quality Assurance Directorate [SR&QA]. This contract would have provided for various functions in support of the SR&QA Directorates oversight of KSC prime contractor activities. The new contract would have included some of the tasks that previously were performed by Hernandez Engineering Inc. and Analex Space Systems, Inc. Analex has provided database management, software programming and other support to reliability and quality assurance functions including trends analysis and special studies since March 1, 1989. Hernandez has provided data acquisition analysis and other support to safety and engineering functions including hazards analysis and risk assessment and safety review board processes October 1, 1991. KSC has determined that the work can be performed by existing civil service personnel in SR&QA and in other NASA engineering organizations with SR&QA oversight. "Hernandez and Analex have provided outstanding support to the Space Shuttle SR&QA activities during the performance of their contract responsibilities. NASA engineers are prepared to continue performing these functions effectively, with safety as a top priority," Honeycutt said. Honeycutt added, "KSC is reviewing all current and future support service procurement actions in the continuing effort by NASA to cut costs and activities which are not absolutely essential to KSC's primary tasks or which can be consolidated with other activities in a more cost-effective way." [NASA/KSC Release No: 11-95, Feb. 16, 1995.]

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STS-67: TCDT COMPLETED

The terminal countdown demonstration test routinely conducted before each Space Shuttle mission has been completed for the March 2 STS-67 mission of **Endeavour**. The flight readiness review was completed yesterday and preparations have been made to load hypergolic fuels which will occur today. Launch Complex 39A has been closed to all other work during the hazardous fueling operations. Orbiter aft engine compartment closeouts will commence on February 20; the payload bay doors will be closed for flight on February 24 and the launch countdown will begin at 2 a.m. on February 27. The crew of STS-67 includes: Commander **Stephen Oswald**, Pilot **William Gregory**; Payload Commander **Tamara Jemigan** and Mission Specialists **John Grunsfeld**, **Wendy B. Lawrence**, **Samuel Durrance** and **Ronald Parise**. The prime payload is the Astro-2 complement of telescopes. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 16, 1995; UPCOMING SPACE SHUTTLE MISSIONS, Jan. 27, 1995.]

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STS-71 & 70: PROCESSING UPDATES

The Space Shuttle **Atlantis** is being processed for the historic STS-71 Mir docking mission in Orbiter Processing Facility Bay 3; no official date has yet been announced for the mission. Completed processing tasks include: installation of the main landing gear wheel and tire assemblies; tunnel adapter installation preparations and installation of the drag chute. Work in progress today: the removal and replacement of the Freon/water interchanger; preparations to install the main engines and stacking the solid rocket boosters in the Vehicle Assembly Building's High Bay 1. Over in OPF Bay 2,

technicians have completed the final destow of **Discovery's** Spacehab experiments; deployed the Ku-band antenna and opened the payload bay doors to perform functional checks. Post-flight toxic vapor checks near and around **Discovery's** auxiliary power units. The removal of the Spacehab and SPARTAN payloads is scheduled for February 20 and main engine removal is set for March 3. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 16, 1995.]

February 17: STS-67: PAD CLOSED FOR HAZARDOUS FUELING

Today at Launch Complex 39A, the pad is closed during hazardous fueling operations; **Endeavour** is being loaded with hypergolics as part of the pre-launch processing at the launch site. The STS-67 terminal countdown demonstration test and flight readiness reviews have been completed. Key operational milestone (target dates included) are: commencement of Orbiter aft compartment closeouts for flight (February 20); closing payload bay doors for flight (February 24); countdown begun (2 a.m., February 27). [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 17, 1995.]

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NEW MANIFEST AVAILABLE

NASA's Office of Space Flight today released a new listing of planned space launches with the publication of the February 1995 Payload Flight Assignments NASA Mixed Fleet Manifest. The new manifest listing includes payload flight assignments for the Space Shuttle through calendar year 1998 and NASA Expendable Launch Vehicles missions through calendar year 2002. The Shuttle manifest planning for 1999-2002 is omitted pending resolution of the required Space Station assembly sequence launch dates. Changes in the manifest since the previous edition (April 1994) include a change in the Shuttle flight rate which has been adjusted from eight to seven times per year. The flight rate change was done to accommodate changes in the Shuttle operations budget. Calendar year 1998 was added to the new manifest and includes the first five Space Station flights. The new manifest also includes the seven scheduled Shuttle-Mir missions with all Shuttle-Mir flights being assigned to Space Shuttle **Atlantis**. [NASA/KSC Release No. N95-10, Feb. 17, 1995.]

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STS-71: INSTALLATIONS

Technicians preparing **Atlantis** for STS-71 in Orbiter Processing Facility Bay 3 have completed preparations to install the vehicle's tunnel adapter. They have also installed the main landing gear wheel and tire assemblies and the mission's drag chute. Today, work in progress includes: removal and replacement of the Freon/water interchanger; preparations to install the main engines and stacking of the STS-71 solid rocket boosters in the Vehicle Assembly Building's High Bay 1. Key operational milestones for the Mir docking mission: installation of main engines (February 20); installation of the Orbiter Docking System (March 13); installation of Spacelab (March 17); crew equipment interface test (April 11); final payload bay closure (April 12); rollover to the VAB (April

18). [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 17, 1995.]

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STS-70: TDRS-G MISSION

The prime mission of **Discovery's** STS-70 mission is to deploy TDRS-G [Tracking and Data Relay Satellite-G]. The mission's five-member crew includes: Commander **Tom Henricks**, Pilot **Kevin Kregel** and Mission Specialists: **Nancy Sherlock**, **Donald Thomas** and **Mary Ellen Weber**. Technicians in OPF Bay 2 have completed the final destow (removal) of the Spacehab experiments from **Discovery's** cargo bay. They have deployed the Ku-band antenna and opened the payload bay doors in order to perform functional checks. Today, technicians are conducting post-flight toxic vapor checks near and around auxiliary power units. They are scheduled to remove the Spacehab and SPARTAN payloads and the vehicle's main engines. [UPCOMING SHUTTLE MISSIONS, Jan. 27, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 17, 1995.]

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KSC: SPACE TECHNOLOGY CLEARINGHOUSE

Kennedy Space Center will become a problem-solving space technology clearinghouse for Florida industry, thanks to a recent agreement with the Technological Research and Development Authority (TRDA) to establish the NASA-KSC/Florida Technology Outreach Program. "This jointly-funded program is designed to dramatically expand and accelerate the process of transferring space technology to industry," said **Bill Sheehan**, Chief of the Technology Programs and Commercialization Office. "Through it, we will be helping Florida companies solve their engineering, development and production problems by direct application of KSC-and-NASA-developed technology to their needs." Here's how the program will work: The TRDA will contact with the 67 Florida local economic development agencies and provide funds to work with businesses in their regions to identify their technology needs. After the two have submitted a problem statement to the TRDA, the state agency will review it and forward it to KSC. "We will look at each statement to determine what KSC or NASA technology might be applicable in solving the problem and hopefully provide a solution," Sheehan said. When NASA does not have a solution, KSC will pass the problem to the network of other federal laboratories for consideration. However, the program is also expected to uncover technical capabilities within the state that could match KSC planned development needs, Sheehan pointed out. In this case, the company and NASA could form a partnership that would result in a marketable product for the company and new hardware for the space program at a fraction of the cost to taxpayers.

"This is known as a dual-use partnership, where both parties benefit," Sheehan explained. "The agency has been mandated to promote and encourage such partnerships with businesses, and it will be a major part of the new way that NASA does business." KSC has been a pioneer in the dual-use concept for the agency. In 1993, the NASA Space

Act Agreement between the State of Florida and the space center was signed by Governor **Lawton Chiles** and then-KSC Director **Robert L. Crippen**. This was the first State/Federal partnership arrangement designed to foster the development of dual-use programs in the country. The Technology Outreach Program is the newest element of the joint KSC/State of Florida effort. This spring, the TRDA, the Economic Development Council of East Central Florida and KSC will sponsor a two-day training workshop that will showcase KSC-developed technologies that can be the basis for immediate dual-use partnerships. The event is an effort to familiarize economic development council representatives from around the state both with the space center and the kind of resources that are available. "We hope to stimulate a lot of interest and spread the word about how working with NASA can benefit everyone," Sheehan said. "By providing direct access to NASA technologies, we are helping to improve economic growth for the state, helping industry solve technology problems, and greatly reducing the cost of developing new hardware and applications for NASA." [Reid, **FLORIDA TODAY**, p. 12C & 11C, Feb. 23, 1995; NASA/KSC Release No: 12-95, Feb. 17, 1995.]

February 20:

HONEYCUTT: MORE JOBS FOR KSC?

"It's possible more of the responsibility will be transferred here" [for the Shuttle Program], according to new KSC Director **Jay Honeycutt**. "Where all of this is going to lead, it's a little early to tell." The Director was responding to news media inquiries about a proposal given to NASA Administrator **Daniel S. Goldin**; the "white paper" suggests "moving management of the Shuttle Program to KSC from Johnson Space Center in Houston." The proposal does not include a move for either astronaut training or Mission Control. Honeycutt did confirm that the proposal did not seek to transfer or end any Kennedy Space Center jobs. The proposal also includes greater control of the space center by contractors including the possibility of control by one major, or prime, contractor such as Lockheed, according to Federation of American Scientists analyst **John Pike**. According to the plan, "none of NASA's 12 facilities would be closed, but, unlike KSC, several face serious cutbacks or transfers." [Cabbage, **FLORIDA TODAY**, p. 1A, Feb. 21, 1995.]

February 21:

ORBITER UPDATES

The Space Shuttles **Endeavour**, **Atlantis** and **Discovery** are continuing to undergo processing activities for missions STS-67, STS-71 and STS-70 respectively: **Endeavour** is at Launch Complex 39A where the loading of hypergolic fuels has been completed and the pad is again open for other processing activities. Today, technicians at the pad have closed out the aft engine compartment and made preparations for ordnance operations. Ordnance will be installed tonight; the payload bay doors will be closed for flight February 24; the STS-67 crew will arrive at 11:15 p.m. on February 26 and the countdown will commence on February 27 at 2 a.m. The seven members of the STS-67 crew are Commander **Stephen Oswald**, Pilot **William Gregory**, Payload Commander **Tamara Jernigan** and Mission Specialists: **Wendy B. Lawrence**, **Samuel Durrance** and

Ronald Parise.

Atlantis remains in Orbiter Processing Facility Bay 3 where it is being processed for its historic Mir Docking mission, STS-71. The crew will include both cosmonauts and astronauts: Commander **Robert L. Gibson**, Pilot **Charles J. Precourt**, Mission Specialists: **Ellen S. Baker**, **Gregory J. Harbaugh**, **Bonnie J. Dunbar** and **Norman E. Thagard** and Cosmonauts (in the role of Mission Specialists) **Anatoly Solovyev**, **Nikolai Budarin**, **Vladimir Dezhurov** and **Gennady Strekelov**. Main engines 1 and 3 have been installed as have been the main landing gear wheel and tire assemblies and the drag chute. Today, technicians are installing main engine No. 2, removing and replacing the Freon/water interchanger and stacking solid rocket boosters in the Vehicle Assembly Building's High Bay 1. Key operational milestones (with target dates) include: installation of the Orbiter Docking System (ODS) on March 13; installation of Spacelab module (March 17); crew equipment interface test (CEIT) on April 11; final payload bay closure on April 12; and rollover to the Vehicle Assembly Building on April 18. **Discovery**, whose last mission was the successful Mir Rendezvous of STS-63, is being processed for its next mission - STS-71- which is targeted for a June liftoff. The Spacelab and SPARTAN payloads have been removed from **Discovery**'s cargo bay and transferred to the Operations and Checkout Building. Post-flight toxic vapor checks near and around the auxiliary power units have been completed as has been the final destow (removal) of Spacehab experiments. The OPF bay will be cleared today to offload hypergolic reactants from the Orbiter. Space Shuttle main engine removal is scheduled to occur March 3. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 21, 1995.]

February 22:

ENDEAVOUR: FAILED MMU REMOVED

Yesterday, workers at Launch Complex 39A removed a failed mass memory unit (computer) and replaced it with one from **Discovery**. The replacement unit will be tested later today. No impact to the schedule is expected. Ordnance installation has been completed as has the loading of hypergolic fuels. Today, pad technicians are pressurizing the hypergolic reactant tanks, closing out the aft engine compartment and testing the replacement MMU [Mass Memory Unit]. Key operational milestones: closing the payload bay doors for flight (February 24); arrival of the crew (February 26); commencement of the countdown for the March 2 launch (February 27 at 2 a.m.); beginning the loading of external tank with cryogenic propellants (March 1). The STS-67 crew includes Commander **Stephen Oswald**, Pilot **William Gregory**, Payload Commander **Tamara Jernigan**, Mission Specialists **John Grunsfeld** and **Wendy B. Lawrence** and Payload Specialists **Samuel Durrance** and **Ronald Parise**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 22, 1995; UPCOMING SPACE SHUTTLE MISSIONS, Jan. 27, 1995.]

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ATLANTIS & DISCOVERY: PROCESSING UPDATES

Atlantis, being processed for its STS-71 docking mission, has now had all three of its main engines installed and its Freon/water interchanger removed and replaced. Today, technicians in OPF Bay 3 will service the replacement interchanger and the coolant loops. In the Vehicle Assembly Building, the STS-71 solid rocket boosters will be stacked in High Bay 1. Meanwhile, **Discovery** is in OPF Bay 2 undergoing processing activities in behalf of its June STS-70 mission, the delivery to orbit of TDRS-G. The Spacehab and SPARTAN payloads have been removed from the Orbiter and transferred to the Operations and Checkout Building (O & C); TACAN tests have been completed and a mass memory unit (computer) has been removed for installation into **Endeavour** for its March 2 STS-67 mission. **Discovery's** main engines are scheduled for removal on March 3. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 22, 1995.]

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GOES-J SATELLITE ARRIVES AT KSC

The GOES-J weather satellite, to be launched aboard an Atlas I rocket in May, arrived today by C-5A air cargo plane at KSC's Shuttle Landing Facility from the manufacturing plant in California. GOES-J is the second spacecraft to be launched in the new advanced series of geostationary weather satellites for the National Oceanic and Atmospheric Administration (NOAA). The spacecraft is a three-axis internally stabilized weather satellite which has the dual capability of providing pictures while performing atmospheric sounding at the same time. Once in orbit the spacecraft is to be designated GOES-9 and will become the GOES West satellite stationed over the Pacific Ocean. The satellite is being transported today to Astrotech in Titusville where final testing of the imaging system, scientific instrumentation, communications and power systems will be performed. These tests will take approximately two months to complete. Then the spacecraft will be fueled with propellant for the attitude control system, encapsulated in the Atlas nose fairing and prepared for transportation to Launch Complex 36. The Atlas I rocket is currently scheduled to arrive at KSC on April 4. The Atlas stage will then be erected on Pad 36B on April 6 with the Centaur to be erected on April 7. A countdown dress rehearsal is planned for May 3 in which the vehicle will be fully fueled and the countdown activities conducted down to T-31 seconds. On May 6 the spacecraft will be transported from Astrotech to Launch Complex 36 for mating to the Atlas I rocket. The launch of AC-77/GOES-J is tentatively set for May 19 at 1:42 a.m. EDT. The launch window lasts 73 minutes. [NASA/KSC Release No: 13-95, Feb. 22, 1995.]

February 23:

STS-67: FLASH EVAPORATOR WORK

Workers tonight will "over-pressurize" the flash evaporator system (FES) of the Freon coolant loops to determine if a minor pressure leak within the FES could worsen during flight operations. The very minor leak currently known to be within the FES will not impact the mission or the current schedule. Test results will be known February 24.

The hypergolic reactant tanks have been pressurized and the test of a replacement MMU (mass memory unit) has proved successful. Today, pad technicians will close the aft engine compartment and purge the external tank. They will begin loading the tank with cryogenic propellants at 5:18 p.m. on March 1. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 23, 1995.]

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STS-71: MAIN ENGINES INSTALLED

In OPF Bay 3, Atlantis's processing crew has removed and replaced the vehicle's Freon/water interchanger and installed the mission's three main engines. Today, the interchanger and coolant loops will be serviced and the STS-71 solid rocket boosters will be stacked in the Vehicle Assembly Building's High Bay 1. **Discovery**, meanwhile, is being processed for its STS-70 mission in OPF Bay 2; the bay was cleared today to off-load hypergolic reactants. Today, processing technicians will prepare to remove the vehicle's main engines, conduct main propulsion system leak and functional checks and tunnel adapter leak checks. The main engines are scheduled for removal on March 3. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 23, 1995.]

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KSCS MADURA HONORED BY AMS

John T. Madura, Manager of NASA's Weather Projects Office at Kennedy Space Center, was recently elected a Fellow by the Council of the American Meteorological Society (AMS). The Fellow designation is the highest honor that the society can bestow. It recognizes outstanding contribution in the field of meteorology and weather related fields over many years. Fellows are nominated and elected by other AMS members and fellows. Not more than two-tenths of one percent of the approximately 12,000 members may be elected each year. Madura accepted his Fellow certificate at the Society's 75th annual meeting held in Dallas, TX. "I owe this honor totally to the outstanding professionals of the 45th Weather Squadron and the exceptional teamwork of the entire meteorological community," Madura said of the award. "The honor reflects the importance others attach to the American space program and the significant improvements in weather support to space operations. These achievements were only possible through the unselfish cooperation of our great Air Force, NASA, National Weather Service, university and contractor team. The whole team should take a bow." [NASA/KSC Release No: 17-95, Feb. 23, 1995.]

February 24:

FLASH EVAPORATOR SYSTEM TESTS

Managers today will evaluate data from last night's flash evaporator system (FES) tests. Initial results of the test indicate the small leak on the FES coolant loops did not worsen but may have gotten better. Managers also cleared for flight the high pressure fuel turbopump on main engine no. 2. Operations to closeout the aft engine compartment and the payload bay will continue as scheduled today. The external tank has been purged and, today, the aft compartment and payload bay will be closed for flight and launch

countdown preparations were begun. Cryogenic propellant loading will begin March 1 at 5:18 p.m.; the countdown commences at 2:00 a.m. February 27. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 24, 1995.]

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STS-71: FREON/WATER INTERCHANGER REPLACED

Technicians in OPF Bay 3 have removed and replaced **Endeavour's** Freon/water interchanger and coolant loops and installed all three main engines. Work in progress: service of the replacement Freon/water interchanger and coolant loops; main engine securing; payload pre-mate tests; stacking of solid rocket boosters in the Vehicle Assembly Building's High Bay 1. The Orbiter docking system (ODS) is set for installation on March 13; the Spacelab module will be installed March 17; the crew equipment interface test (CEIT) is planned for April 11 and the final payload bay closure is targeted for April 12. **Discovery** continues to undergo processing for its next mission - STS-70 - in OPF Bay 2 where its cargo bay has been cleared for off-loading of hypergolic reactants. Today's processing activities include: removal of the main engine heat shields; preparations to remove the main engines - scheduled currently for March 3 - main propulsion system leak and functional checks; tunnel adapter leak checks. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 24, 1995.]

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PAYLOAD STATUS

Astro-2/STS-67...March 2/Endeavour: Because of the cooling system troubleshooting on **Endeavour**, the closeouts of Astro-2 payload were rescheduled from Thursday to begin at midnight tonight. These activities include removing the protective covers from the telescopes, loading the Ultraviolet Imaging Telescope with film, removing the witness mirrors used for contamination monitoring, and removing red tag items, the ground support hardware not intended for flight. The closeout activities are scheduled to take about 16 hours. The payload bay doors of **Endeavour** will be closed for launch between 9:30 p.m. and midnight on Saturday night.

Spacelab-MIR/STS-71...June/Atlantis: The treadmill was removed from the aisle of the Spacelab earlier this week for troubleshooting and is being reinstalled today. The Integrated Compatibility Test is scheduled for Monday which is the final systems verification test. The Crew Equipment Interface Test, the astronaut familiarization and sharp edge inspection of the Spacelab-MIR module, is scheduled for Tuesday, February 28. The Spacelab-MIR module is scheduled to go into the payload bay of **Atlantis** on March 17.

GOES-J/AC-77...May 19/Atlas I: The GOES-J spacecraft arrived at KSC on Tuesday, February 21 by C-5 aircraft and was taken to Astrotech to begin processing. Today a "match-mate" was performed which is a fit check of the spacecraft's compatibility with

the Centaur upper stage adapter. Next week spacecraft systems testing will begin. The Atlas Centaur (Atlas I) launch vehicle will be erected on Pad 36-B the first week in April. [**KSC Payload Status Report**, Feb. 24, 1995.]

February 27:

STS-67: ASTRO-2 COUNTDOWN

The countdown for mission STS-67 began today at 2:00 a.m. at the T-43 hour mark for a planned launch of Space Shuttle **Endeavour** at 1:37 a.m. Thursday, March 2. The seven-member STS-67 crew arrived at the center's Shuttle Landing Facility at 10:45 p.m. Weather forecasters are currently listing an 80 percent chance of launch criteria violation on Thursday due to clouds and winds associated with a cold front expected to move through KSC Thursday morning. Completed pre-launch work includes: closeouts of aft engine compartment and the payload bay; launch countdown preparations; closing of payload bay doors for flight; crew arrival at KSC and commencement of countdown at T-43 hour mark at 2:00 a.m. this morning. Work in progress today: checkout of the backup flight systems; review and load of flight software into the Orbiter's general purpose computers; stowage of flight crew equipment; test of the vehicle's pyrotechnic initiator controllers. Key operational milestones leading to launch: start of the 12-hour operation to load cryogenic reactants into **Endeavour's** fuel cell storage tanks and the extended duration Orbiter pallet; moving the rotating service structure to launch position; loading of cryogenic propellants into the external tank. The STS-67 crew includes: Commander: **Stephen Oswald**, Pilot: **William Gregory**; Payload Commander **Tamara Jernigan** and Mission Specialists: **John Grunsfeld**, **Wendy B. Lawrence**, **Samuel Durrance** and **Ronald Parise**. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Feb. 27, 1995.]

February 28:

STS-67: COUNTDOWN CONTINUES SMOOTHLY

The countdown for mission STS-67 and the launch of **Endeavour** Thursday morning (March 2) continues as planned today. The countdown began Monday (February 27) at 2 a.m. at the T-43 hour mark. Personnel were cleared from Launch Complex 39A last night as operations began to fill the onboard cryogenic tanks and the extended duration Orbiter tanks with liquid hydrogen and liquid oxygen reactants. Loading was concluded at about 10 a.m. today. The reactants will provide electricity for the Orbiter and crew while in space and drinking water as a by-product during their 15 1/2-day mission. After the pad is reopened to personnel, the Orbiter's mid-body umbilical unit will be demated and retracted into the fixed service structure. Final vehicle and facility closeouts will begin shortly thereafter followed by activation of the Orbiter's communications systems and inertial measurement units. Air Force weather forecasters are currently indicating an 80 percent probability of weather prohibiting launch on Thursday. The primary concerns are for possible showers and low, thick clouds generated by an approaching cold front. The front is expected to pass through the Central Florida area later Thursday morning. During Thursday's 2 1/2 hour launch window, the winds at Pad A are expected to be from the west southwest at 5 knots; temperature 71 degrees F; visibility 7 miles; and

clouds broken at 3,500 - 10,000 feet, 14,000-19,000 feet, and 24,000-29,000 feet. The 24-hour-delay forecast shows great improvement as the front passes through and forecasters list only a 20 percent chance of violation for a launch attempt on Friday. The seven-member astronaut crew arrived at KSC's Shuttle Landing Facility at about 10:45 p.m. Sunday. Today they will be involved with checking out their mission plans, fit checks of their equipment and flights in the Shuttle Training Aircraft. The crew includes: Commander **Stephen Oswald**, Pilot **William Gregory**, Payload Commander **Tamara Jernigan**, Mission Specialists: **John Grunsfeld** and **Wendy B. Lawrence** and Payload Specialists: **Samuel Durrance** and **Ronald Parise**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Feb. 28, 1995; STS-67 Launch Weather Forecast, March 1, 1995.]

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LAUNCH TEAM WINS AWARD FROM NSC

Two KSC Space Shuttle Launch Team managers will accept the National Space Club's Eagle Manned Mission Success Award for the launch team at the organization's Goddard Memorial Dinner March 24 in Washington, D.C. **Albert D. Sofge**, NASA Test Director, and **Bruce F. Bartolini**, Orbiter Test Conductor for Lockheed Space Operations Co., are the official recipients of the Eagle award. However, they and Shuttle Management and Operations Director **Robert B. Sieck** feel that the entire launch team should be recognized for their performance in launch abort and safing operations during the STS-68 launch attempt on August 18, 1994. The countdown, with Sieck as the Launch Director, terminated at T-1.9 seconds when computers on board the Shuttle **Endeavour** shut down the main engines due to an unacceptably high temperature reading in engine number 3's high-pressure oxidizer turbopump turbine. "This is like the team coaches accepting the award for the winning team," Sieck said. "Of course, any team needs leadership, and Al and Bruce are being honored for the direction they provided during the pad safing operations. Their performance, along with that of the rest of the team, is just another example of why we say that the KSC launch team is the greatest in the world." Well-orchestrated teamwork is essential during the safing of the Shuttle after an on-pad abort, since this is the most critical situation the launch team must manage, Sieck said. The total safing system of hardware, software and people must work correctly and quickly to preserve crew and vehicle safety, he emphasized. "NASA management, as well as that of aerospace companies and other industry, recognize the importance of the launch team's critical performance during an event that has such a high degree of consequence," Sieck said. "This is why KSC team members are the 1994 Eagle award recipients." Although Sofge is pleased about the award, he is also sorry that every person on the launch team cannot be at the ceremony to share the spotlight. "Everyone deserves to be there, since the only way you can get through an abort successfully is with team effort," Sofge said. "Bruce and I will be the team representatives." Sofge feels that the team's success can be attributed to the members' professionalism and training. The team trains together during launch countdown simulations and Terminal Countdown Demonstration Tests (TCDDT). Both of these exercises include a launch pad abort sequence," he said. According to Bartolini, all of the team's training came into play during the critical first

eight minutes of the pad abort. "I remember leaving the firing room that day and thinking that this is what we all rehearse and practice for, and that the team had done an excellent job," he said. "It's imperative that everything go right, because if we are not in a proper safing mode we could be faced with an emergency egress situation for the crew." In 1993, the Orbiter **Endeavour's** Flow Director **Tip Talone** and Lockheed Flow Manager **Eric Clanton** were named for making it possible to safely and successfully execute the Orbiter's maiden voyage, STS-49, to capture, repair and release the Intelsat VI communications satellite. In 1991, six launch team members won the Eagle Award for their quick and successful efforts during the final minutes of the STS-31 and STS-41 launch countdowns. They were Lockheed employees **Susan Hunt, Janine Pape, John Sterritt, George Thomas, and Frank Trevassos** and **John Simon** of NASA. **Chris Fairey**, NASA Shuttle Management and Operations, earned the award in 1989 for his accomplishments on STS-26 launch countdown procedures and software. [NASA/KSC News Release: 19-95, Feb. 28, 1995.]

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HONEYCUTT LETTER ON STERLING AWARD

Subject: The Governor's Sterling Award: "The KSC Team has been recognized as a finalist for the Governor's Sterling Award, and will receive a site visit on March 14-17, 1995, to determine if we will be chosen a winner. KSC prepared an application for the Governor's Sterling Award application based on a modification of KSC's President's Quality Award Program Application. The Sterling Award is specifically designed to recognize and promote excellence in achieving the total quality concept in manufacturing, service, health care, public and education sectors in the State of Florida. Awards are presented annually to recognized Florida organizations that excel in leadership, employee involvement, customer satisfaction, and continual improvement. Last year, Naval Station of Mayport, Florida, won the Sterling Award." Since much of the preparation for a site visit was accomplished during our recent President's Quality Award site visit, only a small number of people will be involved in site preparations and the actual site visit. **James Jennings**, Director of Human Resources and Management Systems, will chair the team for the site visit preparation. I ask that you give him your full cooperation and support for the Sterling Examiner's Site visit. Winning the President's Quality Improvement Prototype Award was a great step in recognizing our quality efforts. Winning the Governor's Sterling Award will hopefully gain acknowledgement of the high degree of risk involved in our mission, and how the KSC workforce ranks as the best in the world." Signed **Jay F. Honeycutt**. [Letter; Honeycutt, Jay F. to Distribution; Feb. 28, 1995.]

MARCH

March 1:

NEW SPACEPORT USA CONTRACTOR

Kennedy Space Center Director **Jay Honeycutt** has selected Delaware North Parks Service (Buffalo, NY) for negotiations leading to the award of a concession agreement to operate Kennedy Space Center's Public Visitor Program and the facilities of Spaceport USA. The three companies that submitted bids in October of last year for the concession agreement included Delaware North Park Service, The Bionetics Corporation (Hampton, VA) and TW Recreational Services (Spartanburg, SC), the incumbent concessioner. Delaware North Parks Service will manage and operate Spaceport USA and conduct a variety of educational and informational programs, including providing tours of Kennedy Space Center and portions of Cape Canaveral Air Station. Spaceport USA attracts the largest attendance of any NASA visitor center and ranks as one of Florida's top attractions. In 1994, an estimated 2.1 million people visited Spaceport USA. Entirely self-supported, Spaceport USA's gross revenues totaled about \$35 million last year. No appropriated funds are used to operate the visitor's center. NASA expects to enter into a new concession agreement covering a 10-year period beginning May 1, 1995, with an option to extend for one 5-year period. TW Recreational Services has served as the concessioner since 1967 when the first public tour was given. What began with a small trailer and one tour bus has blossomed over the years and now encompasses a rocket garden, an art gallery, many educational exhibits, several theaters including two large-format IMAX screens, a full-size Space Shuttle mock-up, tour buses, the astronaut memorial and a large souvenir store. [NASA/KSC Press Release No: C95-c, March 1, 1995.]

March 2:

SUCCESSFUL STS-67 LAUNCH

The countdown for the launch of **Endeavour** on mission STS-67 proceeded smoothly this morning with liftoff occurring at 1:38 a.m. EST, about 1 minute and 13 seconds later than the originally targeted liftoff time. The slight delay was due to engineers discussing a potential problem with a heater system on the flash evaporator system. A backup heater was utilized and the countdown proceeded. The STS-67 crew includes: Commander **Stephen Oswald**, Pilot **William Gregory**, Payload Commander/Mission Specialist **Tamara Jernigan** and Mission Specialists: **John Grunsfeld**, **Wendy B. Lawrence**, **Samuel Durrance** and **Ronald Parise**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 2, 1995.]

March 3:

SRBS RETRIEVED; ARRIVE TODAY

The solid rocket booster retrieval ships are scheduled to arrive at Hangar AF before noon today. Post-flight assessments of the boosters will begin Monday (March 6). Personnel on the retrieval ships indicate no apparent anomalies. The pad sustained minimal damage...nothing serious or unexpected as a result of launch activities. Meanwhile,

Atlantis continues to undergo processing for its historic STS-71 mission currently targeted for early June; processing is underway in OPF Bay 3. The vehicle's main engines have now been secured. Today's processing activities include: servicing replacement Freon/water interchanger and coolant loops; payload pre-mate tests; preparations for Spacelab tunnel installation; stacking of solid rocket boosters in the Vehicle Assembly Building in high bay 1. Milestones: installation of the Orbiter Docking System (March 13); installation of Spacelab module (March 17); docking system test (March 28); crew equipment interface test (April 11); final payload bay closure (April 12); rollover to the Vehicle Assembly Building (April 18). **Discovery**, in OPF Bay 2, continues to undergo post-mission processing following its successful STS-63 flight. The vehicle's main engine heat shields have been removed and tunnel adaptor leak checks have been made. Today, technicians will remove the Orbiter's main engines and conduct main propulsion system leak and functional checks. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 3, 1995.]

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32ND SPACE CONGRESS PREVIEW

The 25th anniversary of Apollo 13's triumphant return to earth will be vividly remembered when Astronaut **Fred Haise** shared memories of his harrowing voyage during the Space Congress banquet on April 25. Footage from the upcoming Apollo 13 movie starring **Tom Hanks**, **Kevin Bacon** and **Bill Paxton** will also be shown during the evening event. In addition, Apollo 15 astronaut **David Scott**, technical advisor on the movie, will discuss techniques used to simulate space flight. Both Scott and Haise will talk about the film's realities. In addition to the banquet, other highlights of the 32nd Space Congress will include four major panel sessions with participation from leading space experts discussing the following important topics:

- *Government's role in nurturing the space industry
- *Space Station-one year report card
- *What aerospace companies are doing to promote space
- *The future of space

Dozens of technical papers submitted from aerospace authorities representing government, industry and academic institutions will also be presented. One of those paper presenters will be Dr. **Paul Curto**, Chief Technologist of NASA's Inventions and Contributions Board. He will lead a session entitled, "Spinoffs and Setbacks" featuring a prestigious gathering of prominent NASA inventors, scientists and engineers. "By gauging the excellent responses we've received so far from program participants and the number of worldwide inquiries about registration information, we believe this year's Space Congress may be one of the best ever," said General Chairman **Skip Olson**. "It's going to be great." Excitement is also building about the free public events planned for the 32nd Space Congress. In keeping with tradition, there will be a student science fair and the ever-popular "Meet the Astronauts" night chaired by KSC Director **Jay Honeycutt**. Also open to the public will be the exhibit halls, featuring extensive

displays from major aerospace companies showcasing their latest developments. Said Exhibits Chairman **John Grumm**, "We're expecting a complete sellout of exhibit floor space this year. Nearly all of the top NASA and DOD contractors are expecting to be here. It should be an impressive show for everyone."

Space Congress activities begin the morning of Tuesday, April 25 with a keynote address from General **Thomas Moorman**, USAF Vice Chief of Staff. Events conclude the evening of Friday, April 28 with the Pioneer's Banquet at Patrick AFB Officer's Club. Sponsored by the Canaveral Council of Technical Societies [CCTS], Space Congress is considered the oldest and most respected forum of its kind in the world. Launched in 1964, Space Congress is intended to facilitate the exchange of space science and engineering information among the government, industry and educational communities. [32nd Space Congress News Release, March 3, 1995; Borenstein, THE ORLANDO SENTINEL, June 30, 1995.]

March 4: FOUR WORKERS INJURED IN LEAK

"It wasn't a very big leak, but it was enough to create a noticeable red cloud," said NASA spokesman **Bruce Buckingham** about the small leak of toxic rocket propellant which required treatment for four workers. All four workers, part of a group of some 30 workers at Launch Complex 39B, were treated for possible exposure to cloud of propellant gases. The leak was of nitrogen tetroxide which is used as an oxidizer in the Shuttle's maneuvering engines and steering jets. The leak incident occurred at 11:45 a.m. and the pad was reopened for routine tasks by 5:30 p.m. ["Toxic Leak At Launch Pad Slightly Injures 4 Workers," FLORIDA TODAY, p. 5A, March 5, 1995.]

March 6: STS-71-PROCESSING ON SCHEDULE

Technicians processing **Atlantis** in OPF Bay 3 have serviced the vehicle's replacement Freon/water interchanger and coolant loops and have made Orbiter docking system (ODS) lift and balance checks. Today, processing activities include payload premate tests, preparations for Spacelab tunnel installation and the stacking of the mission's solid rocket boosters in the Vehicle Assembly Building's High Bay 1. Key operational milestones for the mission: installation of the tunnel adapter on March 8; transporting of the ODS to the Orbiter Processing Facility (OPF) on March 9; installation of the ODS on March 13; installation of the Spacelab module on March 17; a docking system test on March 28; crew equipment interface test (CEIT) on April 11; final payload bay closure on April 12 and rollover to the Vehicle Assembly Building on April 18. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 7, 1995.]

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STS-70: LAUNCH TARGET IS JUNE 22

Discovery continues to undergo processing activities in preparation for its STS 70 launch which is tentatively scheduled for June 22. In the OPF's Bay 2, technicians have

removed **Discovery's** main engines and will today conduct main propulsion system leak and functional checks and orbital maneuvering system pod functional checks. The vehicle's Canadian-built robot arm - also known as the remote manipulating system - is scheduled to be removed from the Orbiter. Meanwhile, the solid rocket booster retrieval ships are at Hangar AF where post-flight assessment of the SRBs will begin today. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 7, 1995.]

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HIGH SCHOOL LCC SET FOR DEBUT

Local high school students will conduct the first official launch from a one-of-a-kind Launch Control Center on wheels March 9 at University High School in Orlando, FL. More than 140 dedicated and energetic students in Principles of Engineering Technology classes taught by instructor **Rob Catto** spent more than 15,000 hours meticulously transforming the interior of a full-size, 26-foot (eight-meter) long school bus into a mobile mini-firing room. Twelve engineers from Kennedy Space Center volunteered technical expertise for the project, and equipment was donated by NASA, the Orange County School Board, and several corporations. The bus is outfitted with nine operator consoles, four equipment racks, a workbench and VIP seating. It features such standard launch control center systems as a countdown clock display, RF and hard-line communication systems, launch sequencer computer, and a launch control system which provides both monitoring and command of all pad and launch vehicle equipment. Ten students, each performing a key countdown function such as telemetry systems officer, will staff the mobile center. Slated for launch on its third official flight is the Space Shuttle Explorer, a 1/40 scale replica of the U.S. Shuttle which also was built by students in Catto's engineering technology classes. This will be the second year in a row the students launch Explorer in honor of National Engineers Week and engineering outreach activities conducted year-round by NASA, contractor and other engineers nationwide.

The students hope that eventually the mobile Launch Control Center can be used as part of an educational outreach effort throughout the state of Florida and possibly the southeastern United States. Future plans include construction of small sounding rockets and a mobile launch tower on a trailer to accompany the Launch Control Center on its travels. Students from other schools can then design small payloads which can be launched on of the sounding rockets to an altitude in excess of one mile (1.6 kilometers.) The March 9 launch of Explorer will take place at 10:15 a.m. from Launch Pad 39C at University High School. KSC officials scheduled to be present for the event include Center Director **Jay Honeycutt**; Shuttle Management and Operations Director **Robert B. Sieck**; Launch Director **James Harrington**; Payload Management and Operations Director **John T. Conway**; Engineering Development Director **Walter Murphy**; Installation and Management Operations Director **Marvin Jones**; Acting Director, Safety and Reliability **Joel Reynolds**; and Public Affairs Director **Hugh Harris**. University High School is located at 11501 Eastwood Drive, Orlando. [Hodges and Catto. NASA/KSC News Release No. 23-95, March 6, 1995.]

NEXT-GENERATION SHUTTLE MANAGEMENT

House Speaker **Newt Gingrich** (R-GA), speaking to business leaders in Marietta, GA, said that NASA Administrator **Daniel S. Goldin** is "considering a plan to put private contractors in charge of a proposed next-generation Space Shuttle." Gingrich said that "Goldin is looking at contracting out the management of the Shuttle. The next-generation Shuttle that Goldin has prepared says the federal government will only be a customer. And I've been told by private contractors they can probably build it in a third of the time for no more than a third to 40 percent of the cost." Cutting costs and bureaucracy in the current Shuttle program is the aim of an independent study panel led by former JSC Director **Christopher Kraft**. NASA spokesman **Brian Welch** said, "Obviously, NASA is looking very seriously at ways to operate space systems more cheaply. That's part of what the Kraft panel is looking at." The panel was established last year to evaluate Shuttle work at KSC, JSC, MSFC and the Stennis Space Center (Bay St. Louis, MS). The Kraft panel, as part of its charter, is reviewing current contractual arrangement for operating the four-vehicle Shuttle fleet. [Halvorson, **FLORIDA TODAY**, p. 7A, March 7, 1995.]

March 7: COMPONENT REFURBISHMENT FACILITY CONTRACT

Military Construction Co. (Orange Park, FL) has been awarded a \$7,851,155 contract to construct the 36,950-square-foot (3,434-square-meter) Component Refurbishment Facility at Kennedy Space Center. This facility is designed to improve the cleaning and refurbishment of Space Shuttle flight and ground support hardware and to reduce the impact of this operation on the environment. The small business firm will have approximately 300 days to complete the first phase of the Component Refurbishment Facility construction project on Contractor Road in the Launch Complex 39 area. The building will house the Wiltech Co. operations now located in the Propellants Storage and Service Area on Saturn Causeway approximately one mile east of the Vehicle Assembly Building. Deterioration of operations support facilities in this location, constructed in the mid-1960's, is a major reason for the move. Components requiring the highest degree of cleanliness will be processed in a 4,900-square-foot (455-square-meter) clean room facility that will reduce the potential for contamination of Shuttle hardware. Some of the components to be precision cleaned in this area include Shuttle flight hardware and valves, filters and flex hoses for ground support equipment gas and fuel lines. Water and chemical cleaning of fixed launch support systems and component parts will be conducted in a Rough Clean area. Disassembly, inspection and testing of fluids system components will take place in another room that will feature a machine shop. The building will also contain a hydraulics laboratory, a storage area and offices. The building is designed to support a new aqueous cleaning technique for components that will allow the use of water instead of chlorofluorocarbon cleaning agents. [NASA/KSC News Release: , n.d.]

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KSC TELEPHONE SYSTEM CONTRACT

Space Mark, Inc. [Colorado Springs, CO] has been awarded a \$8,446,624 fixed-price contract for the operations and maintenance of the Kennedy Space Center Administrative Telephone System. This contract is for a five-year period consisting of one basic year with four one-year options. The small, disadvantaged business firm began work March 1, 1995. The telephone system is critical to Space Shuttle and payload processing operations, providing a communications link between hundreds of facilities at the 140,000-acre center. There are over 20,000 telephones on this network, and connections are made through four large telephone exchanges. The network also supports three voice-mail systems. [NASA/KSC News Releases No. 22-95, March 7, 1995.]

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STS-71: ODS CHECKED

The STS-71 solid rocket boosters have been stacked in the Vehicle Assembly Building, awaiting the rollover of **Atlantis** scheduled for April 18. In the OPF Bay 3, meanwhile, technicians have serviced the replacement Freon/water interchanger and coolant loops on the Orbiter and have conducted lift and balance checks on the Orbiter Docking System. Today, OPF techs processing **Atlantis** will conduct Orbiter hydraulic operations and flight control checks, payload premate tests and install the Spacelab tunnel adapter. The ODS will be brought to the OPF tomorrow and installed into **Atlantis** on March 13. Technicians will conduct an ODS test on March 28, a CEIT on April 11 and close the payload bay on April 12 in preparation for the rollover to the VAB. In OPF Bay 2, **Discovery** has had its main engines removed. Today, workers will remove **Discovery's** Remote Manipulator System (RMS), make main propulsion system leak and functional checks and orbital maneuvering system pod functional checks. While **Atlantis** and **Discovery** are being readied for their next missions, **Endeavour** continues in orbit above the Earth; the crew has been employing the three telescopes aboard the Astro-2 platform and sending data to Earth home at a high rate. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 7, 1995.]

March 8:

STS-71: SRBS STACKED

In the Vehicle Assembly Building, technicians have stacked the solid rocket boosters that **Atlantis** will use in its historic STS-71 mission June 9. Other completed tasks include: Orbiter Docking System (ODS) lift and balance checks; Orbiter hydraulic operations and flight control checks and servicing of the replacement Freon/water interchanger and coolant loops. Today, in OPF Bay 3, technicians are conducting payload premate tests and installing the Spacelab tunnel adapter. Mission processing milestones: transport of the ODS to the OPF; installation of the ODS into **Atlantis** on March 13; mating the external tank and solid rocket boosters also on the 13th, installing Spacelab into **Atlantis** on March 17; docking system test on March 29; crew equipment interface test on April 7; final payload bay closure on April 12 and rollout to the Vehicle Assembly Building on April 18. **Discovery** is being processed in OPF Bay 2 for its STS-70 mission on June

30. The Orbiter's robotic arm has been removed. Today, technicians are making main propulsion system leak and functional checks and conducting orbital maneuvering system pod functional checks. Meanwhile, STS-67 continues to orbit the Earth. The crew is commanded by **Stephen S. Oswald** and the Pilot is **William G. Gregory**. Payload Commander is **Tamara E. Jernigan**. Mission Specialists are: **John M. Grunsfeld** and **Wendy B. Lawrence** and the Payload Specialists are **Samuel T. Durrance** and **Ronald A. Parise**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 8, 1995.]

March 9:

STS-71: INSTALLATIONS READY

Two major hardware elements scheduled to fly aboard **Atlantis** on the first docking flight between the U.S. Space Shuttle and the Russian Mir Space Station are ready for installation. On March 13, the Orbiter Docking System will be placed in the forward area of the payload bay of **Atlantis**, undergoing pre-light processing in OPF Bay 3. Several days later, on March 17, a Spacelab module is scheduled for installation in the aft area of the cargo bay. The two elements will be connected via a Spacelab tunnel. "Next week is going to be a big week for us," said **Atlantis** Flow Director **Conrad Nagel**. "It's our most significant week so far in preparing the Orbiter midbody for flight." The Orbiter Docking System (ODS) includes an airlock, a supporting truss structure, a docking base, and a Russian-built docking mechanism, the Androgynous Peripheral Docking System (APDS). Once installed, the ODS will be connected to the internal airlock on **Atlantis** via a Spacelab tunnel adapter. During the first docking flight, STS-71, the APDS will be mated to a matching interface located on a docking port of the Kristall module, attached to the Mir space station. Crew members aboard **Atlantis** and Mir will be able to pass back and forth between the two mated spacecraft during joint operations. The Spacelab module, identified as Spacelab-Mir for STS-71, will serve a dual purpose during the historic flight. "The Spacelab-Mir will act as a workroom for conducting research as well as a storehouse, so to speak, where materials can be stowed," said Payload Mission Specialist Operations Engineer **Scott Higginbotham**.

Spacelab-Mir will carry a complement of experiments focusing on the life sciences. Medical data will be gathered on the three crew members returning from Mir - including U.S. astronaut **Norman E. Thagard** - as well as on two cosmonauts who will transfer from the Shuttle to the space station. The Spacelab will also carry a diverse array of logistics hardware, experiment samples and other items slated for transfer to the Mir. The installation of the ODS and Spacelab-Mir in **Atlantis'** payload bay will pave the way for other noteworthy processing milestones at KSC. STS-71 crew members will be in the Orbiter Processing Facility on March 21 for an alignment check of one of the cameras which will be used during the docking sequence, giving them their first close-up look at the complete ODS-Spacelab complement. Tentatively scheduled for March 29 is an end-to-end test, again including the flight crew. During this test, the crew will be stationed inside the Orbiter cockpit to rehearse the actual docking sequence. Simulating the Kristall docking port will be a Russian-built passive docking system attached to an

Orbiter Processing Facility crane. The end-to-end test will provide an excellent opportunity to further prepare the crew for STS-71. Rollover of **Atlantis** from the Orbiter Processing Facility to the Vehicle Assembly Building is currently targeted for April 19, followed by rollout to Launch Pad 39A on April 16. The launch of STS-71 is expected in the late May/early June time frame. [NASA/KSC Release No. 24-95, March 9, 1995.]

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STS-71: TUNNEL ADAPTER INSTALLED

Technicians preparing **Atlantis** for its STS-71 mission have completed payload premate tests, installed the Spacelab tunnel adapter and tunnel extension and made Orbiter hydraulic operations and flight control checks. Today, the Orbiter Docking System is being transported to the OPF and **Atlantis'** potable water system is being serviced. Meanwhile, in OPF Bay 2, **Discovery** is being readied for its STS-70 mission at the end of June. The vehicle's robotic arm has been removed. Today, technicians are making main propulsion system leak and functional checks and making functional checks of the orbital maneuvering system pods. The installation of the Orbiter's drag chute has been scheduled. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 9, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 10, 1995.]

March 13:

STS-71: MAIN ENGINE REPLACEMENT?

Managers will be discussing over the coming days data from Marshall Space Flight Center indicating a possible need to replace one or more of the main engines on **Atlantis**. The reason stems from a potential concern with the high pressure fuel turbopumps. If an engine changeout is performed, no impact to **Atlantis'** flow schedule is expected. Preparations have been completed for the installation aboard **Atlantis** today of the Orbiter Docking System which has been moved to the Orbiter Processing Facility's Bay 3 where the vehicle is being processed. Payload premate tests have been completed and installation of the Spacelab tunnel adapter and the tunnel extension has been completed. The ammonia system is being serviced today. In OPF Bay 2, **Discovery** is being readied for its STS-70 flight. The vehicle's robotic arm [RMS] has been removed. Today, the technicians working on **Discovery** will make main propulsion system and auxiliary power system leak and functional checks and make functional checks as well of the orbital maneuvering system. Meanwhile, the seven-member crew of **Endeavour** continues to orbit the Earth and operate the Astro-2 telescopes. The crew members are: Commander **Stephen S. Oswald**, Pilot **William G. Gregory**, Payload Commander **Tamara E. Jernigan**, Mission Specialists **John M. Grunsfeld** and **Wendy B. Lawrence** and Payload Specialists **Samuel T. Durrance** and **Ronald A. Parise**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 13, 1995.]

March 14:

STS-67 UPDATE; PROCESSING NOTES

A mission management decision today determined that the STS-67 mission will NOT be extended. Landing remains set for Friday at 2:54 p.m. at Kennedy Space Center. Meanwhile, managers have decided to remove two of **Atlantis'** three main engines in order to inspect two high pressure fuel turbopumps for potential cracks on the volute liner, a pressure vessel at the discharge end of the fuel pumps, on engines 1 and 2. No impact to **Atlantis'** processing flow schedule is expected. The Orbiter Docking System has been installed in **Atlantis**; the Spacelab tunnel adapter and tunnel extension have also been installed. Preparations continue to remove the main engines. In OPF Bay 2, **Discovery's** RMS has been removed. Today, technicians will make main propulsion system and auxiliary power unit leak and functional checks and conduct orbital maneuvering system pod checks. The drag chute is scheduled for installation. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 14, 1995.]

March 15:

KRAFT REPORT ISSUED

A team of aerospace executives headed by former Johnson Space Center Director **Christopher Kraft** has recommended that NASA modify the Space Shuttle program's management structure. The report to NASA Administrator **Daniel S. Goldin** recommends separating developmental activities from flight operations and suggests that NASA should "relinquish the majority of the operational responsibility to a prime contractor." The team was formed by Goldin in November 1994 to provide independent recommendations to supplement a comprehensive internal review of the Space Shuttle program. Goldin asked Kraft's team to focus on innovative approaches to significantly decrease total operational costs while maintaining safety and reliability. Recommendations from the report will be consolidated with NASA's ongoing Office of Space Flight Review and forwarded to Administrator Goldin in mid-May. **Bryan O'Connor**, Deputy Associate Administrator for Space Shuttle, said. "The Kraft Report's themes of reducing the role of civil service employees, increasing contractor accountability, and reducing the number of government-to-contractor interfaces are all consistent with Administrator Goldin's guidelines for restructuring the Shuttle program." He said that some of the recommendations from the Kraft Report already are being implemented. "For example, we agree with Dr. Kraft's team that a review of program requirements is appropriate after more than a decade of experience operating this system. Our goal is to significantly reduce the number of normal maintenance and launch processing steps required before each flight, based on that wealth of experience." The Kraft Report also recommended minimizing modifications to the Shuttle fleet. Changes in hardware and software should only be made "to improve safety, reduce operating costs, make the vehicle more reusable, or test new technologies," the Report concluded. O'Connor said, "We are minimizing changes to the fleet consistent with the priorities laid out by the Kraft committee. We agree with this recommendation." The Kraft team's report also recommended the Space Shuttle program should:

*Establish a clear set of program goals, placing a greater emphasis on cost-efficient operations and user-friendly payload integration.

*Redefine the management structure, separating development and operations and reduce NASA's role in the daily operation of the Space Shuttle.

*Provide the necessary environment and conditions within the program to pursue these goals.

"The Shuttle is a very mature space vehicle, with over 65 successful launches," Kraft said. "The team felt the Shuttle program is being managed about as well as it can be, given the present management structure. We commend them on what they've accomplished to date, about a 25 percent reduction in their operations costs over the past three years. But if NASA wants to make more substantive gains in terms of efficiency, cost savings and better service to its customers, we think it's imperative they act on these recommendations and make a commitment to this proposed management structure," Kraft said. "And we believe these savings are real, achievable, and can be accomplished with no impact to the safe and successful operation of the Shuttle system."

The Report stated, "Given the maturity of the vehicle, a change to the mode of management with considerably less NASA oversight is possible at this time." Of the management options the team considered, the structure preferred was to consolidate the operations under a single business entity, such as a prime contractor. This option increases the contractors' role and responsibility in the Shuttle program, allows the contractor to focus on Shuttle operations and provides for a more direct introduction of profit motives and cost reduction. The team also concluded the prime contractor option would be the most achievable and practical. By selecting from among the current contractors, as opposed to an open competition, the team said NASA "could accomplish all the objectives in a less disruptive and more expeditious manner, realizing potential cost reductions more quickly."

The team recommended seven steps to ensure the success of the new management structure:

1. Freeze the current vehicle configuration and minimize future modifications. Those modifications which are made should concentrate on improving safety and reducing operating costs.
2. Conduct a comprehensive requirements review with the goal of significantly reducing procedures between flights based upon experience gained during almost 70 flights to date.
3. Consolidate and reduce program and project elements, limiting NASA involvement in operations and minimizing NASA-contractor interfaces.

4. Restructure and reduce the overall Safety Reliability and Quality Assurance [SR & QA] elements -- without reducing safety.
5. Streamline payload processing and integration, minimizing costs and reducing the length of time required to place a payload aboard the Space Shuttle.
6. Structure operational contracts to provide real incentive to reduce costs while accomplishing safe and successful missions.
7. Allow the hiring of NASA personnel by the prime and subcontractors to ensure proper expertise and talents exist to continue with safe and successful operations.

The Shuttle Management Review Team consisted of aerospace executives, business leaders, and former NASA officials; they were:

- * **Dr. Christopher C. Kraft, Jr.**, Team Chairman
Former, Director, Johnson Space Center
- * **Col. Frank Borman**, USAF (Ret.)
Former Eastern Airlines Chief Executive Officer and retired astronaut
- * **George Jeffs**
Former President, Rockwell International North American Aerospace Operations
- * **Robert Lindstrom**
Former Senior Vice President and General Manager for Space Operations. Thiokol Corporation, and retired manager of the Space Shuttle Projects Office. Marshall Space Flight Center, Huntsville, AL
- * **Thomas Maultsby**
Vice President, General Research Corporation, and former senior Department of Defense representative to NASA Headquarters, Washington, D. C.
- * **Isom Rigell**
Former Vice President, Florida Operations, United Space Boosters, Inc., and retired Director, Shuttle Payloads and former Director, Launch Vehicle Operations, Kennedy Space Center, FL. [NASA/KSC News Release No. 95-27, March 15, 1995.]

STS-71: TWO ENGINES TO BE REMOVED

The Orbiter Docking System, Spacelab tunnel adapter and tunnel extension have all been installed in **Atlantis** preparatory to the vehicle's STS-71 docking with the Mir Space Station in June. Today, two of the three main engines will be removed for inspections of the turbopumps and the external tank will be mated with the mission's solid rocket boosters in the Vehicle Assembly Building. In OPF Bay 2, **Discovery** is being processed for STS-70; the prime activity in its processing is the removal of auxiliary power unit #2 and the installation of the mission's drag chute. Presently, STS-70 is expected to launch in the last week of June. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 15, 1995.]

March 17:

STS-67: WEATHER IMPERILS LANDING

The landing of **Endeavour** at the conclusion of its STS-67 mission remains scheduled for March 17 at 2:54 p.m. EST on orbit 245. Two later opportunities are also available tomorrow afternoon at Kennedy Space Center, 4:30 p.m. and 6:07 p.m. Clouds and rain associated with a low pressure system moving through Florida may prohibit landing operations today. If a wave-off is made, **Endeavour** will remain in orbit another day and attempt a landing at KSC or at Edwards on Saturday. Tomorrow three landing opportunities are available at KSC and three at Edwards. The STS-67 crew includes Commander **Stephen S. Oswald**, Pilot **William Gregory**, Payload Specialist **Wendy Lawrence**, Payload Specialists **Samuel Durrance** and **Ronald Parise**. Meanwhile, processing work continues on **Atlantis** for its upcoming STS-71 flight. The vehicle's main engines have been removed and returned to the Vehicle Assembly Building. The Orbiter Docking System (ODS) has been installed in the Orbiter as well. Today, OPF Bay 3 technicians will conduct Orbiter Docking System/**Atlantis** integrated power verification and tunnel adapter integration tests. In the VAB, the external tank will be mated with the mission's solid rocket boosters. **Discovery** continues to undergo STS-70 processing activities in OPF Bay 2; the vehicle's external tank door has been functionally checked. Auxiliary power unit leak and functional checks have also been made. Work in progress today: installation of the Orbiter's drag chute, main propulsion system leak and functional checks, orbital maneuvering system pod functional checks and removal of the auxiliary power unit #2 which is scheduled for replacement. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 17, 1995; NASA/KSC Release No. 27-95, March 17, 1995; STS-67 Landing Weather Forecast, March 17, 1995.]

CONTRACTOR SAFETY AWARDS

A strong tradition of safety continued at the Kennedy Space Center in fiscal year 1994, and on March 14, a select group of NASA contractors were recognized for their contribution to the center's excellent record. "KSC already has the best safety statistics of any NASA center," said **Joel Reynolds**, acting director, Safety and Reliability, "and

fiscal '94 was our best year ever. It was a superior effort with everyone pulling together." The safety awards program was established to recognize the achievements and contributions of contractors to NASA safety. Annual awards are presented to those organizations which have exhibited high quality in safety performance during the entire fiscal year. For fiscal 1994, the top safety honor...the Center Director's Award...was granted to six contractors: Analex Space Systems In. [Titusville], provider of technical support services; The Bionetics Corp. [KSC], life sciences support contractor; I-Net Corp. [KSC], launch/operational support services; Harris Space Systems Corp. [Rockledge], technical support services; Hernandez Engineering [KSC], technical support services; and Martin Marietta Manned Space Systems' Launch Support Services [Cocoa Beach], technical support services. The Center Director's Award goes to those contractors which achieve highest evaluations of specific safety criteria, Reynolds said. Areas which are considered include management and employee support for safety programs; effective communication on safety issues and practices; safety statistics and training programs; safety inspections, surveys and follow-up; mishap reporting, tracking and follow-up; and workplace inspections.

Three contractors and one contractor team received Awards of Distinction, having achieved high evaluations based on the same criteria as the Center Director's Award. EG&G Florida Inc. [KSC], the base operations contractor; Rockwell Florida Operations [KSC], the Shuttle logistics contractor; and USBI Co. [KSC], launch/operational support services provider, received individual company awards for their safety performance. The Space Shuttle processing team comprised of Lockheed Space Operations Co. [KSC], and subcontractors Thiokol Corp., Space Services [Titusville]; Grumman Technical Services Inc. [Titusville], and Johnson Controls World Services Inc. [Cape Canaveral], also received the Award of Distinction. Ten contractors received Accident Prevention Certificates during the awards ceremony, held in KSC Headquarters. The certificate is granted to a contractor that has achieved a safety record of no lost-time injuries during the award year. The recipients were Analex Space Systems; the Bionetics Corp.; Harris Space Systems Corp.; Hernandez Engineering Inc.; I-Net Corp.; Martin Marietta Space Systems' Launch Support Services; Thiokol Corp. Space Operations, KSC Operations, Launch Support Services; as well as Digital Equipment Corp. [KSC]; HFS Inc. [KSC]; and NYMA Inc. [Cocoa Beach]. Harris, which topped the list, recorded 865,185 man-hours without a lost-time accident. [NASA/KSC Release No. 25-95, March 17, 1995.]

March 18:

STS-67 LANDING WEATHER FORECAST

An upper level trough of low pressure is centered now over north Florida and is drifting eastward. Weather conditions will continue to be marginal with a severe thunderstorm watch expected this afternoon. Edwards Air Force Base has good landing weather conditions for the first two opportunities, however, there is a crosswind concern for the third opportunity. [STS-67 LANDING WEATHER FORECAST, March 18, 1995.]

March 20:

CURRENT PAYLOAD STATUS REPORT

STS-67/Astro-2 [**Endeavour**]: The removal of the mid-deck experiments from **Endeavour** was performed on Runway 22 and was completed 3 hours 47 minutes after landing. **Endeavour** was later towed to NASA's Dryden Flight Research Facility at Edwards Air Force Base. The film removal from the Ultraviolet Imaging Telescope (UIT) will occur tonight.

STS-71/Spacelab-Mir [**Atlantis**]: In the Operations and Checkout (O & C) Building last Thursday, the Spacelab Mir laboratory was unable to be hoisted from its test stand to be installed into the payload canister due to the unusual center of gravity associated with the STS-71 module. The ground support equipment is being modified and another attempt will be made today to install the Spacelab-Mir laboratory into the payload canister. It will be transported to OPF Bay 3 on Wednesday for installation into the payload bay of **Atlantis**. The two-day Interface Verification Test is scheduled for March 27-28. After testing is complete the Spacelab tunnel will be installed connecting the laboratory with the crew cabin.

STS-73/USML-2 [**Columbia**]: With the exception of one element, integration of the USML-2 flight hardware into the experiment racks are complete at an O & C off-line laboratory. Integrated tests are being performed this week. In parallel, Spacelab subsystem testing is also being performed. The Mission Sequence Test (MST) is scheduled to occur next week on March 28-30 and the astronauts will be participating. The experiment racks are currently scheduled to be installed into the laboratory module on April 19.

GOES-J [Atlas 1]: Work on GOES-J continues on schedule. The fit check with the payload adapter was successfully completed. A deployment test of the solar sail and of the magnetometer boom has also been completed, and a solar array extension was performed. The primary, secondary and scan mirrors for both the Imager and sounder instruments have been cleaned. Based on experience with GOES-8, the attitude and orbit control electronics were removed from GOES-J so that additional shielding could be installed. This will provide additional protection from high energy electron charging which can occasionally occur from the space environment. An end-to-end communications test is scheduled for Wednesday [March 22] and a network compatibility test is planned for Thursday [March 23]. The end-to-end test will be primarily between the NOAA satellite control center in Suitland, MD, and the telemetry of the satellite. The network test will also include the ground stations necessary to support launch including MILA tracking station at KSC, the Air Force, Jet Propulsion Laboratory tracking stations, and the Goddard Space Flight Center satellite control facilities. A complete spacecraft electrical functional test is planned to be performed on March 24 and March 25.

STS-76/Tethered Satellite (TSS-1R) [**Columbia**]: Tethered Satellite [to be flown again in February 1996], is scheduled to arrive from Italy aboard a 747 airplane at the Shuttle Landing Facility on Wednesday between 7:00 and 7:30 p.m. It will be taken to the Operations and Checkout Building to begin testing. [**PAYLOAD STATUS REPORT**, March 20, 1995.]

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ENDEAVOUR LANDS IN CALIFORNIA

Endeavour landed today at 4:47 p.m EST at Edwards Air Force Base (CA) on runway 22 on orbit 263. **Endeavour's** Kennedy Space Center landing was waved off due to low clouds, rain and thunderstorms at the Shuttle Landing Facility. Landing was rescheduled for Saturday on the first of three opportunities. Saturday KSC landing attempts were also waved off for reasons similar to those of Friday and mission managers decided to land **Endeavour** and end STS-67 at Edwards. The Orbiter traveled 6.9 million statute miles by mission's end. **Endeavour** is in the mate/de-mate device at Dryden. Off-load of the residual cryogenics is complete and turnaround operations for the ferry flight to KSC are in process. Managers anticipate being able to begin the return flight on Friday (March 24). Meanwhile, the Space Shuttle **Atlantis** (OV-104) is being processed for its STS-71 Mir docking mission in Orbiter Processing Facility Bay 3. Technicians in the OPF have finished the Orbiter's docking system integrated verification tests, the potable water servicing and have mated the mission's external tank with solid rocket boosters in the Vehicle Assembly Building. Preparations are underway to install the mission's main engines. The flight crew for STS-71 will be at KSC tomorrow to participate in camera alignment checks; the Spacelab module will be installed March 22 and the main engines on March 23. **Discovery** (OV-103) is in neighboring OPF Bay 2 where it is undergoing processing for its upcoming STS-70 mission to deliver the TDRS-G satellite to geosynchronous orbit above the Earth. **Discovery's** auxiliary power unit number 2 has been removed; the drag chute has been installed and external tank door functional checks have been completed. Today, technicians will make main propulsion system leak and functional checks, orbital maneuvering system pod functional checks and mechanical and electrical checks of auxiliary power unit no. 2. Payload premate tests are scheduled. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, March 20, 1995.]

March 21:

STS-67: TURNAROUND OPERATIONS

Turnaround operations for **Endeavour's** ferry flight back to Kennedy Space Center are underway at Edwards Air Force Base (CA). The power reactant storage and distribution system tanks have been drained and repressurized and the aft Space Shuttle main engine doors have been removed for access to the engine compartment. **Endeavour**, riding atop the modified 747 Shuttle Carrier Aircraft, is scheduled to depart Edwards in the morning of March 24 with a probable return to KSC's Shuttle Landing Facility at mid-day on the 25th. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, March 21, 1995.]

ORBITER PROCESSING UPDATES

While **Atlantis** has been in OPF Bay 3 being readied for its upcoming STS-71 mission, it has successfully completed its Orbiter Docking System/Orbiter integrated verification tests. Currently, technicians are making Orbiter Docking System center-line camera alignment checks, preparations to install the vehicle's main engines and conducting potable water servicing. STS-71 scheduled activities include installing the Spacelab and the main engines, conducting Docking System and crew equipment interface tests with the mission crew in attendance and final payload bay closure. **Atlantis** is targeted for rollover to the Vehicle Assembly Building on April 18. Meanwhile, **Discovery** is being prepared for its STS-70 [TDRS-G] mission in OPF Bay 2. Technicians have removed and replaced the vehicle's auxiliary power unit no. 2, installed the Orbiter's drag chute and made external tank door functional checks. Today, technicians are making payload bay reconfiguration and premate tests. **Discovery's** main propulsion system and orbital maneuvering system are also undergoing leak and functional checks. Mechanical and electrical checks are being made of APU no. 2. Simultaneously, in the Vehicle Assembly Building, workers are stacking the solid rocket boosters which will be used in the mission. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 21, 1995.]

NEW MAIN ENGINE READY TO FLY

NASA has successfully completed testing a new high pressure liquid oxidizer turbopump and is ready to fly an upgraded main engine on its first Space Shuttle flight in June 1995. "Completing flight certification of the Alternate High Pressure Oxidizer Turbopump is a major milestone in the Space Shuttle Main Engine (SSME) program," said **Otto Goetz**, SSME Deputy Project Manager for Development, Marshall Space Flight Center. "The Alternate Turbopump is now ready for its first flight and for nine flights thereafter. Credit goes to Pratt and Whitney and Rocketdyne, to the experts in Marshall's Science and Engineering Directorate, and to the folks at Stennis Space Center who supported an aggressive test program," Goetz added. NASA completed final certification of the new liquid oxygen high pressure turbopump on March 15. The new pumps underwent a test program that is equivalent to 40 Space Shuttle flights. By achieving this milestone, NASA reached the final step in certifying the turbopumps for flight. "The certification is unprecedented in that none of the certification units had to be removed from the engine during the test series," said Goetz. NASA did not perform any detailed inspections other than verifying free pump rotation after each test. The high pressure liquid oxygen pumps used in the current SSME must be removed after each flight for inspection. The new pumps will not need any detailed inspection until they have flown ten times. The new pumps also are expected to increase safety margins and reliability for the SSMEs. These engines provide approximately 1.5 million pounds of thrust during launch of the Shuttle to low-Earth orbit.

The new turbopump also incorporates state of the art technology in its design. The pump housing is produced through a casting process, thereby eliminating all but six of the 300 welds that exist in the current pump. Eliminating welds is one of the keys to increasing safety margins on the main engine. The new pump uses a ball bearing material - silicon nitride (a type of ceramic). Silicon nitride offers several advantages over the steel bearings currently in use. The material is 30 percent harder than steel and has an ultra-smooth finish which allows for less friction during pump operation. Friction creates heat that leads to wear on the bearings. These new ceramic bearings eliminate concerns over excessive wear to the pump-end ball bearing. Along with the new turbopump, NASA will fly a new two-duct powerhead. This new powerhead will significantly improve fluid flows within the engine system by decreasing pressure, reducing maintenance and enhancing overall performance of the engine. It will replace three smaller fuel ducts in the current design with two enlarged ducts to achieve improved engine performance. This new engine configuration is being called the Block 1 engine. On STS-70, one SSME will be a new Block-1 engine. The remaining two engines will have the current SSME design. The first flight planned to incorporate the new pumps into all three engines is STS-73, currently targeted for launch in September 1995. The SSME project is managed by NASA's Marshall Space Flight Center. Pratt and Whitney (West Palm Beach, FL) developed and manufactured the new pump; Rocketdyne (Canoga Park, CA) will integrate the pump into the main engine. [NASA/KSC Release No. 95-32, March 21, 1995.]

March 22:

ENDEAVOUR FERRY FLIGHT

Turnaround operations for **Endeavour's** ferry flight back to Kennedy Space Center continue today at Edwards Air Force Base, CA. Riding atop the modified 747 Shuttle Carrier Aircraft, **Endeavour** is not scheduled to depart Edwards before Saturday morning [March 25] with a probable return to KSC's Shuttle Landing Facility mid-day Sunday, weather permitting. Winds and rain in California delayed work necessary for an earlier planned departure. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 22, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 23, 1995.]

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STS-71: MIR DOCKING MISSION

Orbiter Docking System center-line camera alignment checks and Orbiter Docking System/**Atlantis** integrated verification tests have been completed in preparation for the April 18 rollover of **Atlantis** from Orbiter Processing Facility Bay 3 to the Vehicle Assembly Building for mating with its STS-71 stack. Today, technicians are transporting the Spacelab module from the Operations and Checkout Building for installation into the vehicle. Preparations are also underway to install the mission's main engines. Potable water servicing has also been planned for today. The main engines will be installed March 23 and March 24. The STS-71 flight crew will be at Kennedy Space Center for a Docking System test on March 28-29. Final payload bay closure is targeted for April

12. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 22, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 23, 1995.]

March 23:

STS-70: MISSION PROCESSING UPDATE

The Space Shuttle **Discovery** is being processed for its upcoming STS-70 mission in OPF Bay 2. Functional checks of both the orbital maneuvering system and the main propulsion system have been performed as well as mechanical and electrical checks of auxiliary power unit no. 2. Today, OPF Bay 2 will be closed for hazardous operations involving removing and replacing a thruster and auxiliary power unit no. 2 connections. In the VAB solid rocket booster stacking operations are underway in Bay 3. Space Shuttle Main Engine installation will commence March 27. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 23, 1995.]

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DELAWARE NORTH WINS SPACEPORT CONTRACT

Kennedy Space Center Director **Jay F. Honeycutt** has selected Delaware North Parks Service [Buffalo, NY], for negotiations leading to the award of a concession agreement to operate Kennedy Space Center's Public Visitor Program and the facilities of Spaceport USA. The three companies that submitted bids in October of last year for the concession agreement included Delaware North Parks Service, The Bionetics Corporation [Hampton, VA] and TW Recreational Services [Spartanburg, SC], the incumbent concessioner. Delaware North Parks Service will manage and operate Spaceport USA and conduct a variety of educational and information programs, including tours of Kennedy Space Center and portions of Cape Canaveral Air Station. Spaceport USA attracts the largest attendance of any NASA visitor center and ranks as one of Florida's top attractions. In 1994, an estimated 2.1 million people visited Spaceport USA. Entirely self-supported, Spaceport USA's gross revenues totaled about \$35 million last year. No appropriated funds are used to operate the visitor's center. NASA expects to enter into a new concession agreement covering a 10-year period beginning May 1, 1995, with an option to extend for one 5-year period. TW Recreational Services has served as the concessioner since 1967 when the first public tour was given. What began with a small trailer and one tour bus has blossomed over the years and now encompasses a rocket garden, an art gallery, many educational exhibits, several theaters including two large-format IMAX screens, a full-size Space Shuttle mockup, tour buses, the astronaut memorial, eateries and a large souvenir store. [NASA/KSC News Release No. C35-c, March 23, 1995.]

March 24:

STS-71: PROCESSING CONTINUES

Atlantis has now had its three main engines installed for the STS-71 mission. In addition, the Spacelab module has been installed and a functional test of the Orbiter docking system has been completed. Today, technicians in OPF Bay 3 will secure the

main engines; complete electrical mating of Spacelab to the Orbiter; implement potable water servicing; make redundancy checks of the orbital maneuvering and reaction control systems and make leak checks of the crew cabin. Milestones: spacelab verification tests on March 27 and 28; flight crew arrival at KSC for a docking system test on March 28 and 29; crew equipment interface test on April 8; final payload bay closure on April 12 and rollover to the Vehicle Assembly Building on April 18. Meanwhile, the Space Shuttle **Discovery** is also being processed for its next mission - STS-70. Thruster L2D has been replaced and today, OPF Bay 2 has been closed for hazardous operations and auxiliary power unit No. 2 connections. Solid rocket booster stacking operations for STS-70 are also underway in the VAB. The installation of main engines will commence on March 27. Turnaround operations for **Endeavour's** return to Kennedy Space Center continue at Edwards Air Force Base [CA]. Later today, the Orbiter will be mated to the Shuttle Carrier Aircraft for its ferry flight to Florida. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 24, 1995.]

March 27:

STS-71: MAIN ENGINES SECURED

The STS-71 main engines have been secured and crew cabin and air lock leak checks have been made as part of the ongoing processing effort to ready **Atlantis** for its mission in June. Technicians in OPF Bay 3 are today conducting a Spacelab-Mir interface verification test (IVT). In the VAB, the external tank/solid rocket booster stack is being closed out. STS-71 work scheduled: docking system testing and astronaut evaluation on March 29; Spacelab experiment stowage on March 30; installation of the Spacelab tunnel on April 3; a crew equipment interface test on April 8; closure of the payload bay doors on April 12 and transfer of the Orbiter to the VAB for mating to the ET/SRB stack on April 18. In OPF Bay 2, **Discovery's** main engine installation is scheduled to begin on March 30. Reaction control system thruster changeout work continues and preparations begin tomorrow for an upcoming leak and functional check of the auxiliary power units and the Orbiter power system validations. **Endeavour**, in the midst of its ferry flight return to Kennedy Space Center, spent the night last night at Dyess Air Force Base (Abilene, TX); the Shuttle Carrier Aircraft left Dyess this morning at 10 a.m. and landed at Columbus Air Force Base (MS) for refueling and a weather update. Forecasters predict that the Shuttle will not fly farther today and should return to Kennedy Space Center tomorrow. If weather does moderate today, arrival should be at approximately 5:45 p.m. [SPACE SHUTTLE STATUS REPORT, March 27, 1995.]

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GOLDIN STATEMENT ON NPR

[The following statement was released by **Daniel S. Goldin**, Administrator of the National Aeronautics and Space Administration, at the White House news conference regarding re-invention and restructuring efforts in the federal government.]

When President **Clinton** and Vice President **Gore** launched The National Performance Review (NPR) to "reinvent government," NASA embraced the challenge with the

innovation and cutting edge ideas that are synonymous with our agency. The accomplishments we have made over the past 2 years to reinvent our programs have allowed us to absorb significant cuts in our budget. We have initiated the first steps by reducing our five-year budget plan by 30% since 1993. Now, we have an opportunity to continue reinventing NASA as an institution, which will result in even further savings to the American taxpayer and help reduce the deficit for future generations.

This initiative continues NASA's plan to develop a space program that does things faster, better, and cheaper. NASA has committed to absorb an additional \$8 billion reduction in "buying power" over the next 5 years. We have already reduced our planned budget runout 4 times this amount. By FY 2000, this will amount to a 25 percent reduction to the funding level in 1995. NASA civil service employees, which have already been reduced by 1500 Full Time Equivalents (FTE) over the past 2 years, will be reduced by at least another 2000 FTE's by FY 2000. NASA has taken us to new worlds, and just as we began a new era of exploration for the American people, we are again developing new ways to fulfill our mission of discovery - in fact, a faster, better, cheaper way for the Nation.

The international Space Station, which includes Russia among its international partners, has gone from costing \$25.1 billion to \$17.4 billion, from 4 prime contractors to one, while senior managers have been reduced from 42 to 4. The Russian participation will allow the first international scientific venture of its kind to be finished 15 months earlier than originally planned, saving the American people \$2 billion. In addition, we have used the redesign of the Space Station Program as a model for our streamlining efforts in other areas. We have also brought down the cost of our major space and earth science program and maintained the high quality science for which NASA is known. For example, we reduced the cost of the Advanced X-Ray Astrophysics Facility (AXAF) from \$5.5 billion to \$2 billion; the Cassini mission to Saturn from \$3.1 billion to \$2.1 billion; and restructured the Earth Observing System (EOS), bringing the cost down from \$17 billion to \$7.3 billion.

The National Performance Review, empowered and led by the President and Vice President, has presented us with an opportunity to learn new approaches to the challenges facing NASA. During Phase I of the Reinventing Government process, we learned a great deal about ourselves and our customers - the science and education communities, policy makers, private industry, and the American people. The result is a new blueprint for the future of our agency. The plan we will follow defines five areas that the Administration, the Congress and the American people have come to recognize as NASA's mission. These strategic enterprises include: Mission to Planet Earth, Aeronautics, Human Exploration and Development of Space, Space Science and Space Technology. With these programs as a foundation, we now enter the second phase of reinventing NASA. This means we're going to revolutionize the structure of NASA - our workforce, our relationship with contractors, and our facilities. In a word, everything. In Phase II, we will complete several internal reviews, including a zero-base

review of the entire agency and then continue the difficult task of streamlining our agency into one of the finest research and development organizations our nation has ever seen.

Over the next five years, NASA's workforce will be reduced as will its support contractors. This will be done with meticulous care, subjecting every aspect of the agency to an evaluation based on the National Performance Review's operating principles of cutting red tape, placing customers first and empowering employees. We will apply these guidelines without jeopardizing the safety of our astronauts and support personnel. NASA's contribution to NPR's reinventing government phase II will be realized with our FY 1997 budget submission to the Office of Management and Budget (OMB) this September. Out of this process a new and even more vibrant NASA will emerge. Consequently, everything from the way we look at a problem to the way we solve it will be affected. Specifically, that applies to the way we design communications systems as well as the way we design human and robotic spacecraft.

America's space agency is at the forefront of President Clinton and Vice President Gore's reinventing government effort. Not only are we eliminating bureaucracy, we're preserving the bold vision the space agency has offered America for five decades. As NASA continues to reach into the heavens, its presence will be apparent here on earth. Consistent with the Administration's emphasis on creating an information superhighway, NASA technology is helping to bolster this vision. By the end of this year, American citizens and companies using the Internet will be able to access a vault of information on NASA technologies that can be applied to their daily activities and businesses. NASA is also continuing the exciting work in the High Performance Computing and Communications program. Our goal is to have computers that can do one trillion calculations a second within the next few years. Cutting edge technologies and ideas are what NASA has built its reputation on, and these products will keep America capable and competitive as the economy of our nation and the world continue to grow. NASA is an investment in America's future. The new NASA, as before, will inspire the next generation of explorers but cost the U.S. taxpayer less. At the conclusion of this process, NASA will be a more efficient, a more effective, and a more relevant agency. This is what the President and Vice President has asked of us; this is what we will deliver. The American people deserve nothing less. [NASA/KSC News Release, March 24, 1995; Kilsheimer, THE ORLANDO SENTINEL, May 20, 1995.]

March 28:

STS-71: NO CONCERNS IN PROCESSING

Atlantis is in OPF Bay 3 being readied for its imminent rollover to the Vehicle Assembly Building. The Orbiter's main engines have been secured and crew cabin and air lock leak checks have been made. STS-71 work in progress: Spacelab-MIR Interface Verification Test (IVT); Orbiter mid-body closeouts; closeouts of external tank/solid rocket booster stack in the VAB. On the processing schedule: docking system testing and astronaut evaluation; Spacelab experiment stowage; installation of the

Spacelab tunnel; crew equipment interface test (CEIT); close payload bay doors and transfer of **Atlantis** to the VAB for mating with the external tank and solid rocket booster stack. Mission managers are currently dealing with no issues or concerns. [SPACE SHUTTLE STATUS REPORT, March 28, 1995.]

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PAYLOAD STATUS REPORTS

GOES-J/AC-77: The AC-77 Atlas 1 (Atlas Centaur) rocket is scheduled to arrive at the Skid Strip on Cape Canaveral Air Station on April 4 and be offloaded on April 5. It will be transported to Hangar J for receiving inspections. The erection of the Atlas first stage at Complex 36, Pad B is scheduled for April 6. The Centaur second stage, or upper stage, will be erected the following day. At Astrotech, work on GOES-J continues on schedule. The sounder and imager electronics boxes were removed from the satellite. At the recommendation of the instrument manufacturer, ITT in Ft. Wayne, Indiana, two printed circuit cards were removed and sent to the factory for rework. The circuit cards were returned today and the imager and sounder electronics boxes are being reinstalled. A re-test is scheduled Friday. The spacecraft end-to-end communications test and the network compatibility test were held last week as scheduled and were completed without any significant issues.

Spacelab-MIR/STS-71: In the payload bay of **Atlantis**, the Interface Verification Test (IVT) between the Spacelab-MIR module and the Orbiter was completed at 9:51 p.m. last night without any significant problems. The test began on Monday morning; it verified the electrical and mechanical connections between the module and the Orbiter and that the laboratory subsystems were working properly. This included a check of the computers, mass memory units, software and data links, intercom systems, refrigerators, smoke sensors, and fire suppression system, and the cabin pressure leak detectors. On Thursday, the initial laboratory module stowage activities will begin. A following stowage will be performed April 7. Today in the Operations and Checkout Building the Spacelab tunnel which connects the laboratory module with the crew compartment is being installed into the payload canister. It will be transported to OPF Bay 3 on Friday and installed into **Atlantis** next Monday. An IVT will be performed on April 6; the Crew Equipment Interface Test (CEIT) of the Spacelab-MIR laboratory module will be performed on April 9.

TDRS-G/IUS-26 STS-70: The Inertial Upper Stage (IUS) booster is scheduled to arrive at the Vertical Processing Facility (VPF) next Monday, April 3. The TDRS-G Tracking and Data Relay Satellite will arrive by aircraft at the Shuttle Landing Facility on Friday, April 7, and be transported to the VPF. After initial inspection and checkout it will be mated to the IUS on April 17 for integrated testing.

USML-2/STS-73: The Mission Sequence Test (MST) with the STS-73 astronauts participating began yesterday and will continue through Friday. The MST is a test of the experiments using a compressed mission timeline. During the test, an oil leak was

found in the Geophysical Fluid Flow Cell experiment which will be repaired at the conclusion of the MST. The experiment racks are tentatively scheduled to be installed into the laboratory module on April 19. USML-2 installation into **Columbia** is currently planned for July 10.

Tethered Satellite (TSS-1R)/STS-75: The Tethered Satellite arrived from Italy aboard a 747 airplane at the Shuttle Landing Facility on the morning of Thursday, March 23. It was taken to the Operations and Checkout Building and unpacking is now complete. Preparations are beginning for testing.

ASTRO-2/STS-67: The Astro-2 payload is scheduled to be removed from **Endeavour's** payload bay on April 5 and returned to the Operations and Checkout Building for de-integration. [Payload Status Report, March 29, 1995.]

March 29:

STS-71: ODS TEST

Technicians in OPF Bay 3 have completed the Spacelab-Mir Interface Verification Test and have made crew cabin and airlock leak tests in preparation for **Atlantis'** STS-71 mission. Work in progress: Orbiter docking system end-to-end tests with the STS-71 crew; Orbiter mid-body closeouts; main engine/main propulsion system integrated testing; closeouts, final test and checkout of the ET/SRB stack in the VAB. STS-71 work scheduled: Spacelab stowage; installation of the Spacelab tunnel; the crew equipment interface test; closure of the payload bay doors and transfer of the Orbiter to the VAB and mate to the ET/SRB stack. [SPACE SHUTTLE STATUS REPORT, March 29, 1995.]

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DISCOVERY & ENDEAVOUR

Discovery/OV-103 (STS-70/TDRS-G): The power system is being validated today. Installation of the three main engines is scheduled to begin Thursday. Reaction control system thruster changeout work is complete. Preparations are underway for the upcoming leak and functional checks of the auxiliary power units. The waste containment system will be installed next week. In the Vehicle Assembly Building, the right forward center segment was stacked yesterday as planned. Stacking of the right forward segment is underway today. Routine thermal protection system work continues.

Endeavour/OV-105 (STS-67): The Orbiter has been jacked and leveled; access is being established into the aft main engine compartment today. The crew access hatch has been opened. Preparations are underway for removing the ferry flight tailcone which is scheduled for Thursday. The payload bay door strongback is being attached today in preparation for opening the payload bay doors tomorrow. Post-flight inspections of the windows are underway. [SPACE SHUTTLE STATUS REPORT, March 29, 1995.]

March 31:

STS-71: MIR DOCKING MISSION

Technicians processing **Atlantis** for its STS-71 mission have secured the main engines and completed the main landing gear functional test. Work in progress: testing of the main engines and main propulsion system; installation of heat shields around the main engines and electrical redundancy tests of the orbital maneuvering and reaction control system. Key operational milestones: crew equipment interface test (April 8); final payload bay closure (April 12); rollover to the Vehicle Assembly Building and rollout to Launch Complex 39A (April 25.) The STS-71 crew includes: Commander **Robert Gibson**; Pilot **Charles J. Precourt**; Mission Specialists: **Ellen S. Baker**, **Gregory J. Harbaugh**, **Bonnie J. Dunbar** and **Norman E. Thagard**; Cosmonauts: **Anatoly Solovyev**, **Nikolai Budarin**, **Vladimir Dezhurov** and **Gennady Strekelov**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 31, 1995.]

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DISCOVERY, ENDEAVOUR PROCESSING UPDATES

Work in progress today on **Discovery** includes: preparations for installing the three main engines; preparations for servicing the Orbiter's ammonia system; leak and functional tests of the auxiliary power units (APUs); solid rocket booster stacking operations in the Vehicle Assembly Building's High Bay 3. STS-70 work scheduled: installation of the main engines; payload premate tests; service APUs. **Endeavour**, meanwhile, is now in OPF Bay 1 following its ferry flight return from California. In the OPF, technicians are removing the ferry flight tailcone, establishing access to the aft engine compartment and conducting post-flight inspections. The payload bay doors have been opened. The vehicle's main engines will be removed during the week of April 10. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, March 31, 1995.]

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INTERNATIONAL FUEL CELLS CO. CONTRACT AT KSC

International Fuel Cells Co. [South Windsor, CT] has been awarded a \$4,871,259 contract to supply fuel cell components for the refurbishment of Space Shuttle Orbiter fuel cell power plants. This is the first time that KSC has issued such a contract, which will provide funding for this service through June 30, 1996. The company has been supplying fuel cell power plants and refurbishing them under a subcontract to prime Shuttle contractor Rockwell International Corp. since 1980. However, recent Space Shuttle contract changes have placed procurement responsibility for this function under NASA/KSC jurisdiction. This contract covers the unitized electrode assemblies (UEAs) and separator plates which are used in the refurbishment of the power plants throughout their 2,400-hour life cycle. The refurbishment work allows the use of a power plant for several 8-to-16-day Shuttle missions. This work calls for the power plant to be shipped to International Fuel Cells for the replacement of the UEAs and plates in each unit's power section where the electrochemical reactions take place. The refurbished power plants are then retested and shipped back to KSC. Three onboard fuel cell power plants provide electrical power for the Orbiter and potable water for the crew during Shuttle

missions through an electrochemical reaction of oxygen and hydrogen that takes place in the fuel cells. The three power plants weigh approximately 260 pounds each and are capable of supplying a maximum continuous output of 21,000 watts, enough for the operation of the Orbiter and its onboard payloads through the mission. [NASA/KSC Release No. 29-95, March 31, 1995.]

APRIL

April 3:

STS-71: DOCKING SYSTEM TESTS COMPLETED

In OPF Bay 3, technicians have completed testing of the Orbiter Docking System; they have also finished installation and securing of the vehicle's main engines in preparation for the April 19 rollover to the Vehicle Assembly Building. Today, the techs were closing out the aft engine compartment and making Spacelab closeouts. The crew equipment interface test for STS-71 is targeted for April 8; final payload bay closure is planned for April 12; rollout to Launch Complex 39A is set for April 26. **Discovery** is being processed for its STS-70 mission in OPF Bay 2 where orbital maneuvering system pod functional checks have been completed. Technicians today will make preparations to install the mission's main engines; conduct auxiliary power unit leak and functional checks; service the ammonia system; conduct payload premate tests and undertake solid rocket booster stacking operations in the Vehicle Assembly Building's High Bay 3. STS-70 work scheduled includes: commencement of installation of the Space Shuttle main engines and transfer of the Orbiter to the Vehicle Assembly Building for temporary storage. **Endeavour**, having just returned by Shuttle Carrier Aircraft from its landing site at Edwards Air Force Base [CA], is in OPF Bay 1. The vehicle's main engine tail cone has been removed and post flight radiator inspections have been made. Today, technicians are preparing to remove the Astro-2 payload and remove the main engines. They will commence functional checks of the forward reaction control system and continue access to the aft engine compartment. Scheduled work includes: removal of the payload and main engines. In addition, the extended duration Orbiter pallet must be removed on April 11. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 3, 1995.]

April 4:

STS-71 SPACELAB TUNNEL INSTALLED

In Orbiter Processing Facility Bay 3, technicians have installed the Mir/Spacelab tunnel in **Atlantis** in preparation for the vehicle's STS-71 mission in June. Work in progress today: aft engine compartment closeouts; installation of main engine heatshields; Spacelab closeouts; tunnel connections and electrical checks. Key operational milestones targeted: crew equipment interface test [CEIT] on April 8; final payload bay closure on April 12; rollover to the Vehicle Assembly Building on April 19; rollout to Launch Complex 39A on April 26. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 4, 1995.]

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STS-70 TURBOPUMP REPLACEMENTS

The high pressure oxidizer turbopump slated to fly on main engine No. 1 on STS-70 will be removed and replaced in the Vehicle Assembly Building. This extra requirement has caused about a 7-10 day delay in installing the three Space Shuttle Main Engines. No impact to the overall STS-70 schedule is expected. Meanwhile, orbital maneuvering

system pod functional checks have been completed on **Discovery** which remains in OPF Bay 2. Today, technicians will: prepare to move the vehicle to the Vehicle Assembly Building for temporary storage (April 12) occasioned by the return to KSC of the Space Shuttle **Columbia**. Additional work today includes: auxiliary power unit leak and functional checks; ammonia servicing; payload premate tests; solid rocket booster stacking operations in VAB High Bay 3. **Endeavour** continues to undergo post-flight inspections in Orbiter Processing Facility Bay 1. Preparations are also underway to remove Astro-2 from the cargo bay and the vehicle's main engines. Functional checks of the forward reaction control system have commenced and technicians continued working in the aft engine compartment. The Astro-2 payload will be removed on April 5; the main engines will be removed April 10 and the EDO on April 11. The Orbiter **Columbia** is expected to begin its ferry flight from Palmdale (CA) to KSC on April 11 with an arrival at the Shuttle Landing Facility targeted for mid-day April 12. **Columbia** has spent the past six months undergoing structural inspections and modifications at the Rockwell facility in Palmdale. The Orbiter's next mission is STS-73, a 16-day flight targeted for launch in September. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 4, 1995.]

April 5:

STS-71: 1ST MIR DOCKING

The Mir/Spacelab tunnel has now been installed in **Atlantis** for the historic STS-71 docking mission in June. Work in progress today: aft engine compartment closeouts; installation of main engine heatshields; spacelab closeouts; tunnel connections and electrical checks. Milestones: crew equipment interface test [CEIT] on April 8-9; final payload bay closure on April 12; rollover to the Vehicle Assembly Building on April 19 and rollout to Launch Complex 39A on April 26. In OPF Bay 2, **Discovery** is being prepped for its STS-70 mission whose liftoff is presently targeted for late June. **Discovery's** payload premate tests have been completed. Today, tasks include: preparations for a possible move to the Vehicle Assembly Building for temporary storage (tentatively scheduled for April 12); auxiliary power unit leak and functional checks; ammonia servicing; solid rocket booster stacking operations in the VAB High Bay 3. Meanwhile, **Endeavour** is in OPF Bay 1 where workers today will remove the Astro-2 payload; conduct post-flight inspections; prepare to remove the main engines; make functional checks of the forward reaction control system; continue access to the aft engine compartment. STS-70 work scheduled: removal of the main engines on April 10 and removal of the extended duration Orbiter pallet on April 11. **Columbia** is expected to begin its ferry flight to KSC from California on April 11. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 5, 1995.]

April 6:

PAYLOAD STATUS REPORTS

AC-77/GOES-J: Due to strategic requirements, the arrival of the Atlas 1 (Atlas Centaur) launch vehicle aboard a C-5 military aircraft has been rescheduled for Friday night with the offloading to occur on Saturday morning. The Atlas first stage will be erected on Pad 36B next Monday, April 10. The Centaur second stage will be hoisted atop the Atlas the following day. Currently, the launch date of May 19 is unchanged. Electrical testing of the GOES-J weather satellite which began last week was completed last night and the data is now being reviewed. This test included the imager and sounder primary instruments and all of the satellite's subsystems. Reconditioning of the flight batteries will begin tonight and will last several days.

STS-71/Spacelab-Mir [Atlantis]: In the payload bay of **Atlantis**, stowage aboard the Spacelab Mir laboratory of experiments and associated support equipment continues and will conclude at the end of this week. On Friday, the final activity is to install the spacesuits to be worn by the two Russian cosmonauts aboard **Atlantis** used when they later return to Earth aboard the Soyuz spacecraft. Two Russian technicians will supervise installation of the spacesuits. The payload bay doors of **Atlantis** are scheduled to be closed on Thursday, April 13.

STS-70/TDRS-G [Discovery]: The Inertial Upper Stage (IUS) booster arrived at the Vertical Processing Facility (VPF) on Monday, April 3 and was hoisted into the west test cell of the VPF on April 4. The Tracking and Data Relay Satellite (TDRS-G) is scheduled to arrive by C-5 military aircraft at the Shuttle Landing Facility on Friday morning. The spacecraft will be taken to the VPF and undergo receiving inspections and state-of-health checks. TDRS will be mated to the IUS on April 13 and integrated testing will follow.

STS-69/Wake Shield Facility [Endeavour]: The Wake Shield Facility arrived at NASA Hangar AE on Cape Canaveral Air Station on Monday at 5:45 a.m. It is currently being unpacked and undergoing receiving inspections.

STS-73/USML-2 [Columbia]: Closeout of the experiment racks is underway this week and next week. The Geophysical Fluids Flow Cell (GFFC) which leaked during the Mission Sequence Test has been repaired and is being reinstalled on its experiment rack today, with retest on Friday. Installation of the experiment racks into the module is scheduled for April 19.

STS-67/ASTRO-2 [Endeavour]: The Astro-2 payload was removed from the payload bay of **Endeavour** last night and is being transported to the Operations and Checkout Building today to begin telescope de-integration. The Ultraviolet Imaging Telescope will be returned to the Goddard Space Flight Center for troubleshooting. **[PAYLOAD STATUS REPORT, April 6, 1995.]**

April 10:

LAUNCH SHUFFLE UNDER CONSIDERATION

Missions STS-71 and STS-70 are both being targeted for no earlier than launch dates and options are being protected for each to be the next one launched. A more firm decision is expected within the next two weeks. In OPF Bay 3, **Atlantis** processing continues. Completed tasks include: the crew equipment interface test [CEIT]; tunnel leak checks and final flight control checks. Today's processing activities include: aft engine compartment closeouts; installation of the main engine heatshields; Spacelab final closeouts. **Discovery**, meanwhile, has had its landing gear checked and waste collection system installed. Work in progress: auxiliary power unit leak and functional checks; water spray boiler checks and solid rocket booster stacking operations in the Vehicle Assembly Building High Bay 3. On April 13, the external tank will be mated to the SRBs; on April 17, the three main engines will be installed in **Discovery**. Rollover of **Discovery** to the VAB is set for May 3, with rollout to Launch Complex 39B planned for May 11. **Endeavour** remains in OPF Bay 1; technicians will today de-mate the EDO; prepare to remove the vehicle's main engines and make functional checks of the forward reaction control system. **Columbia** is expected to begin its ferry flight from Palmdale, CA, to Kennedy Space Center tomorrow, with arrival at the Shuttle Landing Facility targeted for late-morning April 12. **Columbia** is scheduled to make an overnight stop at Ellington Field (Houston, TX), weather permitting. **Columbia** has spent the last six months undergoing structural inspections and modifications at the Rockwell facility in Palmdale. **Columbia's** next mission is STS-73, a 16-day flight targeted for liftoff in September. Upon arrival at KSC, **Columbia** will be stored temporarily in the Vehicle Assembly Building until **Atlantis** is rolled out of the Orbiter Processing Facility for external tank mating operations. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 6, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 10, 1995.]

April 7:

MISSION UPDATES

Launch processing for STS-71 continues while Mission Managers are attempting to determine the target launch dates for both **Atlantis** and **Discovery's** STS-70 mission. Today, technicians in OPF Bay 1 are conducting aft engine compartment closeouts on **Atlantis**. In addition, main engine heatshields are being installed on the Orbiter. Spacelab closeouts are underway as are tunnel leak checks and preparations for the crew equipment interface test. Meanwhile, **Discovery** will not be transferred to the VAB for temporary storage but, rather, will remain in OPF Bay 2 for an accelerated flow schedule to meet an earlier targeted launch date. The accelerated flow is made possible by not going to the VAB. **Discovery's** ammonia servicing and landing gear checks have been completed. Today, technicians in OPF Bay 2 are conducting **Discovery's** auxiliary power unit leak and functional checks, water spray boiler checks and solid rocket booster stacking operations in the Vehicle Assembly Building's High Bay 3. **Discovery's** main engines are scheduled for installation on April 17, followed by rollover to the VAB on May 3 and rollout to Launch Complex 39B on May 11. **Endeavour** is in OPF Bay 1

where it is undergoing extended duration orbiter pallet demate preparations, functional checks of the forward reaction control system and preparations to remove the space shuttle's main engines. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 7, 1995.]

April 11:

ORBITER PROCESSING UPDATES

The Space Shuttle **Atlantis** continues to undergo pre-rollover processing for STS-71 in OPF Bay 3. The vehicle's main engine heatshields have been installed; the crew equipment interface test has been installed and final flight control checks have been made. Work in progress today on **Atlantis**: aft engine compartment closeouts; Ku-band antenna tests; Spacelab final closeouts; completion of crew cabin, ODS and Spacelab leak checks. In OPF Bay 2, **Discovery** is being processed for its STS-70 mission in late June. Technicians today are conducting auxiliary power unit leak and functional checks, water spray boiler checks and are removing and replacing window no. 4. Solid rocket booster stacking operations in the Vehicle Assembly Building have been completed. In OPF Bay 1, workers are processing **Endeavour** for its STS-69 mission in late July. **Endeavour** work today includes extended duration Orbiter pallet demate preparations, preparations to remove the main engines, functional checks of the forward reaction control system. STS-69 work scheduled: removal of the EDO; removal of the main engines and removal of fuel cell no. 2. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 11, 1995.]

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COLUMBIA FERRY FLIGHT

The Orbiter **Columbia** departed Palmdale (CA) atop the modified 747 Shuttle Carrier Aircraft at 11:06 a.m. EDT today en route to Kennedy Space Center. **Columbia** is scheduled to make an overnight stop at Ellington Field (Houston, TX) tonight and continue the trip to KSC tomorrow, weather permitting, arriving at about 12 noon at the Shuttle Landing Facility. **Columbia** has spent the past six months undergoing structural inspections and modifications at the Rockwell facility in Palmdale. **Columbia's** next mission is STS-73, a 16-day flight targeted for launch in September. Upon arrival, **Columbia** will be stored temporarily in the Vehicle Assembly Building until **Atlantis** is rolled out of the Orbiter Processing Facility for external tank mating operations. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 11, 1995.]

April 12:

GOES-JAC-77 SET FOR MAY 19

The AC-77 Centaur stage was successfully mated to the Atlas today. The Atlas 1 launch vehicle arrived at Cape Canaveral Air Station by C-5 air cargo plane April 7. The following day it was offloaded and taken to Hangar J for receiving inspections. The Atlas first stage was erected on Pad 36B on Monday. Pad crews yesterday were unable to hoist the Centaur stage atop the Atlas due to wind exceeding the 11 knot limit and because of a problem with ground support equipment. Due to a shipping mishap during

ground transportation, the arrival of the AC-77 fairing is expected to be delayed by several days so that the fairing can be removed from its shipping container and inspected. The GOES-J weather satellite continues to undergo final processing at Astrotech and remains on schedule. Battery charging and reconditioning for launch has been completed and preparations are underway for installing them on the spacecraft. Thruster system cleaning and checkout has also been completed. A helium signature leak check of the spacecraft propulsion system has also been performed. A pressurization test of the propulsion system is currently underway. Spacecraft mechanical closeouts will begin later this week and are expected to be complete Apr 20. [PAYLOAD STATUS REPORT, April 12, 1995.]

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PROCESSING UPDATES

While mission managers are discussing whether STS-71 or STS-70 will launch first, processing continued for both vehicles. **Atlantis** is in OPF Bay 1 where technicians have completed Ku-band antenna tests and installed the main engine heatshields. Today, the aft engine compartment will be closed out along with the Spacelab module; leak checks are being implemented for the crew cabin, Orbiter Docking System and the Spacelab module. Milestones and their target dates include: complete aft engine compartment closeouts (April 13); final payload bay closure (April 14); rollover to the VAB (April 19); rollout (April 25) and hot firing of the auxiliary power units (April 27). Meanwhile, **Discovery** is being readied for STS-70 in OPF Bay 2. While the solid rocket booster stacking operations have been completed in the Vehicle Assembly Building, technicians in the OPF are working today on **Discovery** to conduct auxiliary power unit leak and functional checks; preparing to install the vehicle's main engines; conducting water spray boiler checks and removing and replacing window no. 4. The mission's external tank will be mated to its solid rocket boosters tomorrow. Shuttle main engines will be installed April 17; the payload bay doors will be closed April 25 and the Orbiter is set to rollover to the VAB on May 3. While **Columbia** remains at Ellington Field (Houston, TX) on its ferry flight home from California, **Endeavour** is situated in OPF Bay 1 where it is being processed. Today technicians will remove the extended duration Orbiter pallet from the payload bay and the main engines. They will also make functional checks of the forward reaction control system. The removal of fuel cell no. 2 is scheduled for tomorrow and orbital maneuvering system functional checks will be made April 17. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 12, 1995.]

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SPACELAB-MIR/STS-71: JUNE LAUNCH

The tunnel connecting the Spacelab-MIR laboratory module with the crew compartment was installed April 6. During leak checks the following day it was found the tunnel would not hold pressure. Over the weekend the tunnel was demated and a piece of thermal blanket exterior insulation was found caught in the flange. It was removed, new seals were installed, and the tunnel was reconnected. The leak check was successful. On Saturday, the STS-71 astronauts inspected the Spacelab-MIR laboratory module as

part of the Crew Equipment Interface Test. Changes or suggestions recommended by the crew are being implemented this week. Today the Spacelab module and the crew compartment are fully pressurized for a leak check. Final closeouts will begin tomorrow. This includes a final cleaning, documentation photography and removal of access platforms. Outside the module the mission flags and emblems will be installed. Payload bay door closure is scheduled for April 13. [PAYLOAD STATUS REPORT, April 12, 1995.]

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TDRS-G/STS-70: LATE JUNE LAUNCH

At the Vertical Processing Facility (VPF), work on the TDRS-G Tracking and Data Relay Satellite has been running ahead of schedule. Stand-alone checkout of the spacecraft was completed yesterday. Mechanical mating of TDRS-G to the IUS upper stage booster was performed today, one day ahead of planning. The electrical connections will be established next week and will be followed by an Interface Verification Test (IVT) on April 19. The STS-70 astronauts will conduct an inspection of the satellite on Saturday. Next Monday, April 17, the White Sands Compatibility Test will be performed. Data will flow from the TDRS-G satellite at the VPF through the associated TDRS-G ground station to a TDRS uplink antenna located at KSC's MILA tracking station. Then, via an orbiting TDRS satellite, it will be relayed to the White Sands Ground Terminal in New Mexico for analysis. Also next week, CITE testing using the Cargo Integrated Test Equipment will be performed to assure the payload's compatibility with the Orbiter and readiness to be installed into **Discovery's** payload bay. [PAYLOAD STATUS REPORT, April 12, 1995.]

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STS-69, 73 PAYLOADS

STS-69: At the NASA Hangar AE spacecraft checkout facility, the Wake Shield Facility was unpacked and inspected last week and test equipment was set up. The initial electrical systems testing is now complete and experiment integration is beginning. **STS-73:** Retest of the Geophysical Fluids Flow Cell (GFFC) experiment after repair has been successful. Closeouts of the experiment racks continue. Seven out of ten racks are closed out and the remaining three should be closed out by the close of business April 14. Preparations will then begin for installing the racks into the Spacelab module. A system test of the module was completed this week in preparation for the rack installation which is scheduled for April 19. [PAYLOAD STATUS REPORT, April 12, 1995.]

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COLUMBIA COMPLETES MAINTENANCE PERIOD

The Space Shuttle **Columbia**, the oldest Space Shuttle in NASA's four-Orbiter fleet, rolled out of Rockwell's modification center, Palmdale (CA), this week completing a six-month Orbiter maintenance period. Today, on the 14th anniversary of the first Space Shuttle launch, the 747 Shuttle Carrier Aircraft, with the 100-ton reusable spaceplane

bolted on top, is at Ellington Field, near the Johnson Space Center (Houston, TX), en route to the Kennedy Space Center to be readied for its 18th mission, currently set for September. Astronaut **John Young**, a veteran who flew Gemini, Apollo and Space Shuttle missions, commanded the STS-1 flight. Rookie astronaut **Robert L. Crippen**, who would go on to command three flights on the Space Shuttle and take over the reins of the program as its director and KSC's fifth Center Director, was the pilot on that first flight. **Columbia** arrived in Palmdale for its third modification and inspection period in October 1994. Maintenance periods are conducted on each Orbiter every three years. Previous inspection/modification periods were conducted in 1984-85 and 1991-92. While in Palmdale, more than 66 improvements and modifications were made to **Columbia**. The enhancements were to improve performance, meet mission requirements or reduce turnaround time. Included were wiring changes to allow Shuttle crews to monitor downlink data on laptop computers, installing filters in hydrogen flow control valves to reduce the potential for contamination, and corrosion control measures. Engineers also performed a structural inspection on **Columbia**. Nearly 488 nondestructive and visual inspections, using boroscopes, ultrasonic devices, eddy currents and X-Rays were performed. These inspections showed **Columbia** to be in excellent condition, and fully capable of meeting its 100-mission lifetime requirement. Rockwell completed construction of **Columbia** in March 1979. Its 17 missions to date have accumulated more than 62 million miles and over 2,300 orbits. [NASA/KSC Release No. 95-49, April 12, 1995.]

April 13:

STS-71: PROCESSING UPDATE

Processing continues in Orbiter Processing Facility Bay where technicians are readying **Atlantis** for its historic Mir docking mission - STS-71. The crew compartment/Spacelab-Mir pressure decay test has been completed as has the Spacelab-MIR experiment and support equipment stowage. Work in progress: Spacelab Mir final cleaning; removal of Spacelab access platforms; attachment of flags and mission emblem to Spacelab module exterior; Orbiter mid-body closeouts and aft main engine compartment closeouts. STS-71 work scheduled: installation of aft compartment flight doors tonight; closing payload bay doors tomorrow; positive pressure test of Orbiter tomorrow; start of weight and center of gravity determination on April 17; transfer of Orbiter to the VAB and mating to the ET/SRB stack on April 19. [SPACE SHUTTLE STATUS REPORT, April 13, 1995.]

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PROCESSING ROUNDUP

Discovery: In the Vehicle Assembly Building, the external tank for **Discovery's** STS-70 mission is being mated to the solid rocket booster stack today. On **Discovery**, maintenance and checkout of the cabin air recirculation system is being performed. Potable water servicing is underway. Preparations continue for installation of the three main engines which is tentatively scheduled to begin Monday. In the Vertical Processing Facility, the TDRS-G Tracking and Data Relay Satellite was mated to the Inertial Upper

Stage booster yesterday. **Endeavour**: Removal of the three main engines is complete and the extended duration Orbiter pallet has been removed. Work to remove and replace fuel cell no. 2 is in process. Testing of the flash evaporator system is scheduled to begin today. **Columbia**: Due to concerns about the possibility of afternoon thunderstorms today after **Columbia**'s proposed return to KSC, a decision has been made to reschedule **Columbia**'s departure from Houston until tomorrow. Departure is currently planned for 9 a.m. Eastern time with an arrival at the KSC Shuttle Landing Facility projected to occur at noon. [SPACE SHUTTLE STATUS REPORT, April 13, 1995.]

April 14:

STS-71: HOT FIRING PLANNED

Technicians processing **Atlantis** for its STS-71 mission in June have closed out the aft engine compartment and completed crew cabin, Orbiter Docking System and Spacelab leak checks. Today, the processing crew will be working on final Spacelab closeouts and making preparations to close the vehicle's payload bay doors. Key operational milestones: final payload bay closure [late tonight]; rollover of **Atlantis** to the Vehicle Assembly Building [April 19]; rollout to Launch Complex 39A [April 25] and a hot firing of auxiliary power units [April 27]. Missions STS-71 and STS-70 are both being targeted for no earlier than their projected launch dates in June. Options are being protected for each to be the next one launched. A more firm decision is expected to be announced later this month. One of the delays in setting a firm launch date is due to the availability of test results from a test planned for tomorrow by the Russian Space Agency. The Russians will be testing Spektr, a lab module for Mir and a necessary component of the Russian station before **Atlantis** docks with the station in STS-71. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 17, 1995; Banke, FLORIDA TODAY, p. 4A, April 18, 1995.]

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CREW SELECTIONS MADE: STS-76, STS-79

Five astronauts have been selected to join Air Force Colonel **Kevin P. Chilton** on Space Shuttle mission STS-76 next March, **Atlantis**' third flight to dock with Russia's Mir Space Station. The flight also will include a spacewalk and dropoff of an astronaut to stay five months on the orbiting laboratory. Joining Chilton are Pilot **Richard A. Searfoss**, and Mission Specialists: **Shannon W. Lucid**, **Linda M. Godwin**, **Michael R. "Rich" Clifford** and **Ronald M. Sega**. A crew of five astronauts will join Commander **William F. Readdy** on the fourth Shuttle docking mission - STS-79 - with Mir in August 1996. Readdy was named STS-79 commander in November 1994 and will be joined by Pilot **Terence W. Wilcutt**, and Mission Specialists: **Tom Akers**, **Jay Apt** and **Carl E. Walz**. Astronaut **Jerry M. Linenger** will launch aboard **Atlantis** and switch places on Mir with astronaut **Shannon W. Lucid**. Linenger is expected to stay aboard Mir for about four months. [NASA/KSC News Release No. 95-50, April 14, 1995.]

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PROJECT MERCURY MONUMENT

Mercury 7 Astronauts **Gordon Cooper** and **Scott Carpenter**, as well as the "8th Astronaut," **Bill Dana**, are expected to attend a major event at Titusville's Space View Park on May 12 to dedicate a monument honoring all the men and women who worked on the Mercury program. The exhibit will include bronze tablets, each featuring a Mercury Astronaut's signature and hand print. "It's a beautiful tribute to the huge accomplishments of all the thousands of people who helped launch our nation's space program in the early 1960's," said **Loys Ward**, President of the U.S. Space Walk of Fame Foundation. [U. S. Space Walk of Fame Foundation, **NEWS RELEASE**, April 14, 1995.]

April 17:STS-70: TANK MATED TO BOOSTERS

In the Vehicle Assembly Building, the external tank and solid rocket boosters to be utilized in the launch of STS-70 have been mated in High Bay 3. Today, technicians in the Orbiter Processing Facility Bay 2 are conducting auxiliary power unit leak and functional checks; making preparations to install main engines; servicing and checking out the water spray boilers and removing and replacing window no. 4. Upcoming milestones for the STS-70 mission: crew equipment interface test (April 22); install Space Shuttle main engines (April 24); close payload bay doors (April 25); rollover to the Vehicle Assembly Building; and rollout to Launch Complex 39B's pad (May 11). [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 17, 1995.]

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STS-69: WSF-2 & SPARTAN 201-03

Workers in OPF Bay 1 are making post-flight checks of **Endeavour's** robotic arm (RMS) and functional checks of the forward reaction control system. Technicians are scheduled to make orbital maneuvering system functional checks on April 17. The Orbiter **Columbia**, riding atop the modified 747 Shuttle Carrier Aircraft, departed Ellington Field (Houston, TX) today at about 9 a.m. EDT. It arrived at KSC's Shuttle Landing Facility at 11:52 a.m. Operations to demate **Columbia** from the 747 Shuttle Carrier Aircraft are now underway and the vehicle will be towed to the Vehicle Assembly Building for temporary storage late tonight. Following **Atlantis'** move to the VAB next week, **Columbia** will be moved into Orbiter Processing Facility bay 3 where preparations will begin for its next mission, STS-73, a 16-day flight targeted for launch in September. **Columbia** has spent the last six months undergoing structural inspections and modifications at the Rockwell facility (Palmdale, CA). [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 17, 1995.]

April 18:STS-71: QUALITY INTEGRITY SEALS CHECKED

Analysis conducted tests on two quality integrity seals near the base of the Orbiter Docking System (ODS) delayed closeout operations and pushed the target move time to

the Vehicle Assembly Building to 8:00 a.m. April 20. Meanwhile, The payload bay doors of **Atlantis** have been closed and final payload bay cleaning and inspections have been completed. Today, final ODS checks will be made along with preparations to move to the Vehicle Assembly Building. Rollover is planned for April 20 and rollout to Launch Complex 39A is targeted for April 26. Once at the pad, technicians will conduct a hot firing of the Orbiter's auxiliary power units on April 27. The mission's terminal countdown demonstration test will occur May 16-17. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 18, 1995.]

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ORBITER PROCESSING UPDATES

Discovery [OV-103] remains in Orbiter Processing Facility Bay 2 where the STS-69 crew equipment interface test and the removal and replacement of window number 4 have been completed. The Space Shuttle Main Engines have been installed and the orbital maneuvering system has been checked out. In OPF Bay 1, **Endeavour** [OV-105] has been powered up as work to complete the installation of fuel cell number 2 continues. Preparations also continue to perform functional checks on the left and right hand orbital maneuvering system pods. The fleet's senior Shuttle, **Columbia** [OV-102] is presently in the Vehicle Assembly Building waiting for **Atlantis** to leave the OPF's Bay 3. **Columbia** will swap places with **Atlantis** about two days later and preparations will begin for OV-102's next mission, STS-73. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 18, 1995.]

April 19:

MANAGERIAL CHANGES ANNOUNCED AT KSC

Three NASA managers at Kennedy Space Center have taken on new assignments, effective April 3. **Roy C. Tharpe, Sr.**, Manager, Launch and Landing Projects Office in the Shuttle Management Operations Directorate, has been named Associate Director of Shuttle Management and Operations. In this capacity Tharpe will directly support, **Robert B. Sieck** Directorate head. **Larry C. Ellis**, Deputy Manager, Launch and Landing Projects Office, switches to the Shuttle Operations Directorate. As Chief, Shuttle Processing Office, Ellis will assume the responsibilities formerly held by acting Shuttle Operations Director **Norm Carlson**, who retired March 31. **Brian Harris**, Chief, Program Integration and Mission Planning Office in the Shuttle Management and Operations Directorate, will move into the slot vacated by Ellis. The deputy position being vacated by Ellis is being made into a six-month rotational assignment. **Jan Heuser**, Deputy to the Chief, Technology Programs and Commercialization Office, is the first person to take on the job. [NASA/KSC News Release No. 31-95, April 19, 1995.]

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PROCESSING UPDATES

Atlantis: OV-104 remains in OPF Bay 3 and is being readied for rollover to the Vehicle Assembly Building. Final Orbiter Docking System checks have been made; payload bay doors have been closed and final cleaning and inspections of the bay are also completed.

Today, technicians will make crew hatch and forward compartment closeouts and conduct weight and center of gravity checks. **Discovery**: OV-103, in OPF Bay 2, has had its main engines installed. Today, OPF techs will secure the Orbiter's main engines, checkout the orbital maneuvering system and conduct landing gear functional checks. **Endeavour**: OV-105, is being powered up in OPF Bay 1 as work continues to perform functional checks on the left and right hand orbital maneuvering system pods. In addition, the main landing gear wheel and tire assemblies are being readied for installation. **Columbia**: OV-102, remains the VAB waiting for **Atlantis** to move from Orbiter Processing Bay 3. **Columbia** will then move into the OPF on the 21st where preparations will begin for the Orbiter's next mission, STS-73. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 19, 1995.]

April 20:

STS-71: MIR DOCKING MISSION

Atlantis, whose STS-71 mission will begin no sooner than June 19, has been in OPF Bay 3 where the crew hatch and forward compartment closeouts and center of gravity determinations have been completed. At 9:20 a.m., the Orbiter is scheduled to be rolled over to the VAB and prepared for mating with the mission's external tank. **Atlantis** will dock with the Russian Mir Space Station and return astronaut **Norman E. Thagard** to the United States at mission's end. Meanwhile, **Discovery** is in OPF Bay 2; its landing gear functional checks have been completed. Technicians today will secure the Orbiter's main engines, checkout its orbital maneuvering system and make aft engine compartment closeouts. **Discovery's** primary payload is the Tracking and Data Relay Satellite-G. **Endeavour's** next mission, STS-69, will deliver the Wake Shield Facility 2 and Spartan 201-203 to space. The Orbiter is currently undergoing testing of its orbital maneuvering system pods. Additionally, during its stay in OPF Bay 1, **Endeavour's** main landing gear and tire assemblies have been installed. **Columbia** remains in the VAB. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 20, 1995.]

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SPACEPORT USA OVERHAUL

NASA and Delaware North Park Services [Buffalo, NY] announced today the signing of a 10-year agreement for the operation and management of Spaceport USA, NASA's largest and best attended visitor facility. The firm will assume responsibility on May 1. The agreement provides for a Delaware North investment of nearly \$40 million to fund a major renovation and upgrade of KSC's Public Visitor Program. The company was selected from a field of three offerors which included incumbent concessioner TW Recreational Services and Bionetics. "We believe the Delaware North Park Services' proposal matches our desire to take another leap forward in providing visitors with a better understanding of NASA's mission," said KSC Director **Jay F. Honeycutt**. "By bringing together some of the world's leading experts in the various areas, we are confident Delaware North will be able to make this vision a reality while providing visitors of all ages with an exciting and interesting experience." As a key feature of their proposal to NASA, Delaware North assembled a prestigious team of subcontractors

which will each contribute a unique expertise to the redevelopment and enhancement of the Public Visitor Program, including the first major revamping of KSC's public tours in their 28-year-history. The firm's subcontractors include Edwin Schlossberg Incorporated, Johnson Controls World Services, Coleman Research Corporation, and Robinson Lake Sawyer Miller. The transformation of Spaceport USA into a high-tech, interactive experience in which visitors participate as "citizen explorers" or "citizen specialists" will take place over the next three years with an up front investment of \$35 million by Delaware North. Another \$4.2 million will be invested by the company in a major renovation of existing food service and retail facilities.

Decisions over the exact content of the principal attractions and visitor experiences which will be funded by the investment will be made jointly by NASA and Delaware North in coming weeks as a detailed development plan is initiated to revitalize the telling of the NASA story at Spaceport USA and on the public bus tours of Kennedy Space Center and the Cape Canaveral Air Station. Preliminary concepts suggest attractions such as a full-sized replica of Space Station Alpha, to be located in a facility on the tour, and the possible enclosing of the rocket garden and new "early space program" attractions in a domed structure. Proposed concepts for Space Shuttle-related activities will provide visitors opportunities to assume the roles of ground processing personnel or astronauts in training. In addition to exploring a new array of exhibit and show presentations, visitors will be invited to select and perform a "mission" from one of NASA's five major program areas. "We still have to work out the details of exactly what we're going to do such that our visitor program remains compatible with KSC's primary operational mission, but Spaceport USA is without question going to become a more exciting, higher impact experience which will communicate better than ever before an understanding of NASA and what it does," said **Jim Ball**, Chief of the KSC Visitor Center Branch. Examples of the proposed new activities include a 360-degree theater fly-through of the solar system, a simulated Space Shuttle landing at Kennedy Space Center, exploring environmental issues using data acquired during NASA and international space missions, and attending a mission briefing for astronauts about to embark on a trip to Mars. "A key objective will be making sure that people who visit Kennedy Space Center leave with a better understanding of what the workforce here does for a living, and how it impacts the everyday lives of both our U.S. and international guests," said Ball. In addition to the major improvements to be funded by Delaware North, the company will manage the construction and opening of the new \$35 million Apollo-Saturn V Center attraction which is scheduled to begin construction in May. A major revamping of the public tours will be put into effect when the new facilities are available. Operational concepts include a broader range of tour options, and unlimited time for visitors to stay at facilities like the Apollo Saturn V Center. The 10-year agreement is valued at an estimated \$600 million based on Delaware North projections. NASA has an option to extend the agreement for an additional five years. [NASA/KSC News Release No. 36-95, April 20, 1995.]

April 21:

GOLDIN: EARTH DAY ANNIVERSARY

Goldin statement: In the 25 years since the first Earth Day, we have changed the way we think about our planet. Apollo astronauts captured the Earth as a blue marble against a vast background of darkness - beautiful, but fragile and finite. Our missions to other planets have revealed them to be fascinating and diverse, but also lacking any obvious signs of life. We know of no place like Earth. NASA has developed a program, called Mission to Planet Earth, that captures the spirit of exploration and focuses it back on our own planet. Only from space can we obtain the global perspective needed to better understand how all of the parts of the Earth's environment - air, water, land and life - interact and make life possible. Mission to Planet Earth, for which NASA has partners across the U.S. government and around the world, has helped reveal the Earth's secrets. To give just a few examples: Working with other agencies and industry, NASA researchers helped establish that human industrial activities were threatening the ozone layer. NASA and the National Oceanic and Atmospheric Administration (NOAA) data now indicate that international treaties designed to protect ozone are beginning to work. TOPEX/Poseidon, a satellite developed by NASA and the French space agency, is providing us with our first truly worldwide data on changes in global sea level, and is helping us better track El Nino, a physical change in the Pacific Ocean that dramatically alters weather patterns around the globe. NASA researchers were able to track and measure the cooling effect that the 1991 eruption of Mount Pinatubo had on the Earth's climate. Researchers around the world are still studying the volcano's effect on ozone levels in the tropics. NASA research is helping us to understand natural disasters: floods, earthquakes and severe storms. By better understanding them, we can better prepare for them and lessen their damage. In the longer term, we will need to unravel other mysteries. Will the Earth get warmer? Will sea levels rise, threatening coastal communities? Will rainfall patterns shift? How would climate change affect weather, the frequency of severe storms and the way we live? These are the scientific challenges we will study in the next 25 years. NASA is also participating in the Administration's initiative "Technology for a Sustainable Future." This program cuts across the government to identify and promote technologies that simultaneously protect the environment and promote economic competitiveness. NASA's part of the initiative, called Insight 2000, is a joint effort with NOAA and the Department of the Interior. This program aims to identify users of environmental data beyond the scientific community - state and local governments, educators, industry, not-for-profit groups - and get useful data to them. NASA's environmental research goes beyond Mission to Planet Earth. The office of Aeronautics is working with industry to develop cleaner-burning engines for tomorrow's airplanes. These airplanes will use less fuel and cause less damage to the atmosphere. Within the agency, NASA has developed an extensive environmental management program in all its activities. We instill efficient management practices through pollution prevention and waste minimization. We embrace the principles of environmental justice and pursue "green" use of resources. We will redouble our commitment to achieve compliance with environmental laws and regulations. In more than 35 years of space travel, we have looked out at the Universe

and found that for the time being the Earth is the only place we can live. We have also looked back and seen that our planet is not a collection of separate environments, but a single global environment, protected by a fragile shell of air. On Earth Day 1995, we look forward to the next 25 years, as NASA continues to help humanity understand its environment and how it is changing. [NASA/KSC News Release No. 95-54, April 21, 1995.]

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STS-71 LAUNCH DATE DEPENDS ON RUSSIANS

Based on Russian Space Agency plans to launch their Spektr scientific module between May 21 and May 25, 1995, NASA officials are planning to launch the STS 71 **Atlantis** mission on June 24. NASA will, however, be prepared to launch **Atlantis** a few days earlier if work to reconfigure the Mir Space Station proceeds ahead of schedule. The final launch date will be selected closer to **Atlantis**' flight based on the outcome of Mir's preparations. A decision on which Shuttle mission will fly next is expected no later than May 1. To maintain a planned June launch of **Discovery** with its Tracking and Data Relay Satellite-G payload, NASA managers have accelerated processing of STS-70 and are working toward the capability of launching the mission as early as June 8. STS-70 will be Commanded by three-time Shuttle astronaut **Tom Henricks**, Pilot **Kevin Kregel**, and Mission Specialists **Nancy Sherlock**, **Donald Thomas** and **Mary Ellen Weber**. [NASA/KSC News Release No. 95-55, April 21, 1995.]

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STS-71 & 70: LAUNCH DATES REMAIN UNCERTAIN

Options are being protected for either STS-71 or STS-70 to be the next Shuttle launch. Meanwhile, processing activities for **Atlantis** and its STS-71 mission continue. The vehicle has been rolled to the Vehicle Assembly Building where it will be mated to its external tank and Orbiter/tank leak checks will be conducted. Preparations are underway for the Shuttle interface verification test [IVT]. Orbital maneuvering system checks have been completed on **Discovery** which is being prepared for the STS-70 mission.; landing gear functional checks have also been completed. Today, technicians are securing the vehicle's main engines and conducting forward, mid-body and aft engine compartment closeouts. Key operational milestone targets include: closing the payload bay doors (April 25); delivering TDRS to Launch Complex 39B (May 2); rolling **Discovery** over to the VAB (May 3) and to Launch Complex 39B (May 11). In OPF Bay 1, **Endeavour** is being powered-up as STS-69 work continues to perform closeouts on the left and right hand orbital maneuvering system pods. Hydraulic operations are underway and the fuel cell voltage checks will begin next week. **Columbia** is also undergoing processing activities for its next mission, STS-73. The oldest Shuttle will carry the U. S. Microgravity Laboratory-2 into orbit. This afternoon, **Columbia** will be moved into OPF Bay 3. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 21, 1995.]

April 24:

HST FIFTH ANNIVERSARY

"The Hubble Space Telescope is truly a national scientific treasure," said Dr. Wesley Huntress, Jr., NASA's Associate Administrator for Space Science on the fifth anniversary of the launch of the HST. "With a rate of discovery that is unprecedented for any modern observatory, Hubble not only has revolutionized astronomy, it has engaged the interest and imagination of the public more than any space science satellite has done before. And that may be its most far-reaching and important legacy -- getting a new generation of young people excited about science." [NASA/KSC News Release No. 95-56, April 24, 1995.]

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STS-71: PROCESSING UPDATE

Missions STS-71 and STS-70 are both being targeted for no earlier than launch dates. Options are being protected for each to be the next one launched. The most likely launch date for STS-71 is currently assessed to be on or near June 24. In the meantime, processing activities continue with **Atlantis** being prepared for the STS-71 mission whenever it is finally scheduled. The vehicle has been mated with the mission's external tank following the Orbiter's rollover to the Vehicle Assembly Building. Leak checks have been performed on the Orbiter/external tank configuration. Today, technicians will conduct the Shuttle interface verification test. Key operational milestones: rollout to Launch Complex 39A; hot firing of the auxiliary power units; main propulsion system helium signature tests and the terminal countdown demonstration test. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 24, 1995.]

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STS-70: TDRS-G

In OPF Bay 2, the Space Shuttle **Discovery** has had its main engines secured and the integration tests have been completed. Today, workers are completing forward, mid-body and aft engine compartment closeouts. Target dates for key operational milestones are: closure of the payload bay doors (April 25); delivery of TDRS to LC 39B on May 2; rollover of the Orbiter to the VAB (May 3) and rollout of the Shuttle to Launch Complex 39B (May 11). **Endeavour** is in OPF Bay 1 where technicians are readying the vehicle for its upcoming STS-69 mission. The Orbiter is being powered-up as work continues to perform closeouts on the left and right hand orbital maneuvering system pods and closeouts of the flight control systems. Hydraulic operations are underway and the fuel cell voltage checks are beginning this week. **Columbia** was moved from the Vehicle Assembly Building into OPF Bay 3 at about 3:30 p.m. April 21. The tail cone was removed and the Orbiter lifted off its landing gear and leveled. Preparations are now beginning for its next mission. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 24, 1995.]

EMPLOYEES MAY BRING DAUGHTERS

NASA employees at Kennedy Space Center will have an opportunity April 27 to share their working world with their daughters. The second annual "Take Our Daughters to Work" day is part of a public education program nationwide to break down gender and racial barriers and show young women career options available to them. The first event at KSC in 1994 was successful, with more than 400 daughters of civil service employees participating. Many KSC contractors sponsor similar programs as well. The day begins at Spaceport USA, where each daughter will receive a badge, similar to the typical KSC employee. Morning activities include a welcome from Deputy Center Director **Gene Thomas**, videos, presentations by female engineers, an educational session on spaceflight and a group photo in the Rocket Garden. After lunch, daughters and their escorts will disperse to work sites on-center. Some controlled areas on center will not be accessible for this event because of the hazardous nature of the work performed. Sons of NASA employees will be able to visit KSC workplaces during a "Take Our Sons to Work" day in June. [NASA/KSC News Release No. 37-95, April 24, 1995.]

April 25:

STS-71: ROLLOVER TO VAB

The Space Shuttle **Atlantis** is now in the VAB where it has been mated to the STS-71 external tank and leak checks of the mated stack have been completed. A Shuttle i interface verification test will be conducted today as preparations continue to roll the Orbiter out to Launch Complex 39A tomorrow. Hot firing of the Orbiter's APUs is set for April 27; a helium signature test is planned for May 2 and the terminal countdown demonstration test is targeted for May 24-25. STS-71 will be launched no earlier than June 19. In OPF Bay 2, **Discovery's** crew module hatch and door functional checks have been completed. Today, forward, mid-body and aft engine compartment closeouts will be undertaken and the main engine heatshields will be installed. In addition, main propulsion system leak checks will be made and the payload bay doors will be closed for the Orbiter's move to the Vehicle Assembly Building. **Discovery** will launch no earlier than June 8 and carry a TDRS-G satellite into orbit. Processing activities for **Endeavour's** STS-69 mission and **Columbia's** STS-73 continue. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 25, 1995.]

April 26:

SPACE SHUTTLE STATUS REPORT

Atlantis has been mated with its external tank in the Vehicle Assembly Building and rollout to Launch Complex 39A is expected to commence today at 3:43 a.m. Launch pad validations and a complete Shuttle interface verification test will be implemented today as well. **Discovery**, meanwhile, remains in Orbiter Processing Facility Bay 2. The vehicle's payload bay doors have been closed and today's processing activities include: forward, mid-body and aft engine compartment closeouts, installation of main engine heatshields and main propulsion system leak checks. **Endeavour** is powered up and undergoing processing in OPF Bay 1 while **Columbia** is being readied to be powered up

during processing activities in OPF Bay 3 for its STS-73 mission to deploy the U.S. Microgravity Laboratory 2. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 26, 1995.]

April 27:

STS-71, STS-70 SCHEDULES

Missions STS-71 and STS-70 are both being targeted for no earlier than launch dates. Options are being protected for each to be the next one launched. (The most likely launch date for STS-71 is currently assessed to be on or near June 24.) **Atlantis** has been rolled out to Launch Complex 39A and its auxiliary power units have been hot-fired. Today, pad technicians will complete Shuttle interface verification tests, launch pad validations and gain access to the aft engine compartment of **Atlantis**. The main propulsion system helium signature test is targeted for May 1; the pre-launch propellant load for May 10 and terminal countdown demonstration test for May 24-25. **Discovery**, whose upcoming mission is STS-70, will carry into space and deploy the TDRS-G Satellite. Technicians in OPF Bay 3 have closed the vehicle's payload bay doors and removed the strongback supports; preparations have been made for the Orbiter's move to the Vehicle Assembly Building next week. Today, OPF techs will conduct forward, mid-body and aft engine compartment closeouts and install main engine heatshields. The TDRS-G will be moved to the launch pad late on the evening of May 1; Orbiter rollover to the VAB is set for May 3 with rollout to Launch Complex 39B set for May 11. The following day [May 12] a hot firing test of auxiliary power unit no. 2 will be conducted. The mission's terminal countdown demonstration test is scheduled for May 18-19. Meanwhile **Endeavour** - in OPF Bay 1 - is powered up as work continues to perform closeouts on the left and right hand orbital maneuvering system pods and closeouts of the flight control systems. The Ku-band radar tests and preparations to install the drag chute are underway today. In Bay 3 of the Orbiter Processing Facility, **Columbia** will be powered up today. Access to the aft main engine compartment is underway and preparations are being made to open the payload bay doors. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 27, 1995.]

April 28:

HARRIS NAMED DEPUTY CHIEF ENGINEER

Dr. **Wesley L. Harris** has been named Deputy Chief Engineer (Aeronautics), NASA Administrator **Daniel S. Goldin** announced today. In his new position, Harris, formerly Associate Administrator for the Office of Aeronautics, will provide an independent technical review of NASA aeronautics programs and projects to ensure they are being planned and conducted on a sound engineering basis with proper controls and management of technical risk. Harris will report to the Chief Engineer within the Office of the Administrator. Dr. **Robert E. Whitehead** is serving as Acting Associate Administrator for Aeronautics. [NASA/KSC Release No. 95-58, April 28, 1995.]

STS-71, STS-70 UPDATES

STS-71: The Space Shuttle **Atlantis** has been rolled out to Launch Complex 39A where its auxiliary power units were hot fired, access was gained by pad technicians to the aft engine compartment and launch pad validations were completed. Today, technicians will complete the Shuttle interface verification test and make preparations for the helium signature test and hypergolic fuel operations. The helium signature test is scheduled for May 1; also scheduled : prelaunch propellant load (May 10) and the terminal countdown demonstration test (May 24-25).

STS-70: **Discovery** remains in OPF Bay 2 where the nose gear wheel and tire assembly installation and the TDRS payload readiness review have been completed. Today's work in progress: forward, mid-body and aft engine compartment leak checks and closeouts; preparations for the rollover to the Vehicle Assembly Building next week and preparations to move TDRS [Tracking and Data Relay Satellite] to Launch Complex 39B's Payload Check-out Room on May 1. Rollover to the VAB is scheduled for May 3; rollout is targeted for May 11. Once at the pad, technicians will conduct a hot firing of the vehicle's auxiliary power units. The mission's terminal countdown demonstration test is targeted for May 18-19. Processing work continues to prepare **Endeavour** for its July STS-69 mission and **Columbia** for its September STS-73 mission. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, April 28, 1995.]

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May 1:

LAUNCH SCHEDULES SHIFT

Mission managers decided late Friday night [April 28] to proceed with work to launch STS-70 on June 8, ahead of STS-71 which remains targeted for no earlier than June 19. **Discovery's** STS-70 mission processing continues. Forward, mid-body and aft engine compartment leak checks and closeouts have been concluded. Nose gear wheel and tire assembly installation is also complete. Today, technicians are making preparations to move the vehicle to the Vehicle Assembly Building and are preparing for the arrival of the TDRS-G payload at Launch Pad 39B's Payload Checkout Room at approximately 10:00 p.m. In the meanwhile, **Atlantis** remains at Launch Complex 39A. Pad techs have completed the Shuttle interface verification test; they have hot fired the auxiliary power units and accessed the aft engine compartment. They are preparing for the helium signature test and hypergolic fueling operations. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 1, 1995.]

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ENDEAVOUR & COLUMBIA

Endeavour, currently in OPF Bay 1, is powered up; work to closeout the left and right orbital maneuvering system pods is complete. Preparations to install the drag chute are underway today. The bay will be closed later this week for hazardous operations to service the auxiliary power units. **Endeavour's** next mission will be STS-69 on which the Wake Shield Facility 2 and Spartan 201-203 will be deployed. **Columbia**, in OPF Bay 3, is also powered up and technicians are at work on payload bay door functional checks. Access to the left aft engine compartment and purge connections are complete. **Columbia's** STS-73 mission is planned for September 21 and will involve the use of the U.S. Microgravity Laboratory-2. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 1, 1995.]

May 2:

PAYLOAD STATUS REPORTS

GOES-J/Atlas Centaur 77 [Atlas 1]: The RP-1 Atlas first stage fuel for the AC-77 wet countdown dress rehearsal is being loaded aboard the vehicle today. The countdown will begin at 5:55 a.m. tomorrow, Wednesday, May 3. The gantry at Pad 36-B will be retracted at 8:30 a.m. Loading of the cryogenic liquid hydrogen and liquid oxygen will follow starting at 9:43 a.m. The T-0 time for simulated launch is 11:30 a.m. At Astrotech, the GOES-J spacecraft was fueled with its hydrazine attitude control propellant last Friday. Mechanical closeouts were completed yesterday. The spacecraft will be placed on the Atlas 1 payload adapter tomorrow and be encapsulated into the nose fairing on Thursday. The spacecraft will leave Astrotech for Launch Complex 36 at 1 a.m. on Saturday morning, May 5, and will be mated to the rocket starting at sunrise.

TDRS-G/IUS-26 [STS-70, Discovery]: At 11 p.m. last night [May 1] the TDRS-G Tracking and Data Relay Satellite was moved the 10-mile distance from the Vertical Processing Facility located in the KSC Industrial Area to Pad 39B at the edge of the Atlantic Ocean. It arrived there at 2 a.m. this morning and was then hoisted and installed into the payload changeout room. After some state of health checks, TDRS-G will be fueled with its hydrazine attitude control propellant. Then preparations will begin for installing the payload into the Orbiter which is scheduled to occur on May 13,

WAKE SHIELD FACILITY [STS-69, Endeavour]: In Hangar AE, the Wake Shield Facility experiment integration and checkout is complete. Electrical testing under vacuum is currently underway. The flight batteries will be installed next Monday. The substrates for the growth of crystals will be installed on May 12. The free flyer will be stacked onto the carrier May 15.

USML-2 [STS-73, Columbia]: The now completed experiment racks were rolled into the Spacelab module on April 27. The module's end cone is being attached today. The electrical mates between the racks and the module are also currently underway. The next test activity is the interface verification test (IVT) between the experiment racks and the Spacelab module to verify the electrical connections. It is scheduled for May 18. [KSC PAYLOAD STATUS REPORT, May 2, 1995.]

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STS-70 TO BE LAUNCHED JUNE 8

Mission Managers decided to proceed with work to launch STS-70 on June 8, ahead of STS-71 which remains targeted for no earlier than June 19. "Both of these flights are very important to NASA's space flight effort," said **Brewster Shaw**, Director, Space Shuttle Operations. "STS-70 represents the first flight of the new Block 1 Space Shuttle Main Engine [SSME] with the new Phase 2+ powerhead, single coil heat exchanger and new high pressure oxidizer turbopump. The Block 1 changes will increase SSME durability, reliability and safety margins," he said. "The STS-71 mission," Shaw continued, "represents a significant step forward in our cooperative effort with the Russians and also the development of the international Space Station. By flying the missions in this order, we are able to make the best use of the work force, Shuttle processing resources and the ability to meet our future manifest assignments." Technicians in OPF Bay 2 have closed the payload bay doors, conducted the forward, mid-body and aft engine compartment closeouts and transported the TDRS-G to the Payload Checkout Room at Launch Complex 39B. Technicians working on **Atlantis** at LC 39A have prepared the Orbiter for its STS-71 helium signature test and accessed the aft engine compartment. The helium test and hypergolic fueling operations will be conducted today. **Endeavour** remains in OPF Bay 1 where it is being prepared for a July 20 on STS-69. The vehicle has been powered-up. Work to closeout the left and right hand orbital maneuvering system pods is complete. The drag chute has been installed and checkouts are underway today. The bay will be closed later this week for hazardous operations to service the auxiliary power units. Solid rocket booster stacking operations

are scheduled to begin later this week in the Vehicle Assembly Building. **Columbia** (in OPF Bay 3) is powered-up as well and payload bay door functional checks are complete. Access to the aft engine compartment and purge connections are also complete. [NASA/KSC News Release No. 95-59, May 2, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, May 2, 1995.]

May 3:

APOLLO/SATURN V CENTER CONTRACT

W & J Construction Corp. (Cocoa, FL), KSC's 1994 Small Business Contractor of the Year, has been awarded a \$17 million sub-contract to build the 99,000 square-foot Apollo/Saturn V Center at Kennedy Space Center. This will be a major new facility on the KSC public tour and is designed to preserve an original Saturn V vehicle, a Lunar Lander, and other major artifacts from the Apollo/Saturn era. Exhibits and shows will include a realistic re-creation of an Apollo firing room, a lunar landing and Apollo's return home. The contract for construction was awarded by former concessioner TW Recreational Services, Inc., and has been transitioned to the new Spaceport USA concessioner, Delaware North Park Services of Spaceport, Inc. Construction management will be handled by Morris Architects throughout the construction phase. No appropriated funds will be used in connection with the Apollo/Saturn V Center. Funding for this project will be provided by Spaceport USA bus tour ticket surcharges and from state arranged funding under an interagency agreement between KSC and the Spaceport Florida Authority (SFA) and South Trust Bank of Alabama. Under the arrangement, SFA will provide the financing and own the building under a NASA-granted Use Permit until such time as the outstanding project debt is fully paid. The Apollo/Saturn V Center will be located at the northern end of the existing Banana Creek launch viewing site in the Launch Complex 39 area. Visitors to the Center will enjoy an historical perspective of the significance of the manned lunar program. It is anticipated that construction will be complete and the facility open to the general public in late 1996. [NASA/KSC News Release No. 39-95, May 3, 1995.]

May 3:

DISCOVERY ROLLS TO VAB

Discovery first began its rollover to the Vehicle Assembly Building this morning at 9:05. Technicians in the VAB will prepare to hoist the vehicle to position for mating with the mission's external tank and make preparations to conduct Shuttle interface verification tests. Rollout to Launch Complex 39B is planned for May 11 with a hot firing of APUs the following day. TDRS will be installed in the payload bay on May 13 and the mission's terminal countdown demonstration test is planned for May 18-19. The flight readiness review will occur on May 26. Meanwhile, **Atlantis** is on Launch Complex 39A awaiting the commencement of its STS-71 mission to rendezvous and dock with the Russian Mir Space Station. The vehicle's main propulsion system helium signature test has been completed and pad techs are today preparing for hypergolic fueling operations. **Endeavour** remains in OPF Bay 1 and is being processed for its STS-69 mission; the flight is currently scheduled to begin July 20. **Endeavour** is powered up. Work to

closeout the left and right hand orbital maneuvering system pods is complete. The drag chute has been installed and checkouts are complete. The bay will be closed on Thursday for hazardous operations to service the auxiliary power units and to remove and replace a thruster. Solid rocket booster stacking operations are scheduled to begin later this week in the Vehicle Assembly Building. **Columbia** is in OPF Bay 3; it is powered up and its payload bay doors are open. Access to the aft engine compartment and purge connections are complete. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 3, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 4, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 5, 1995.]

May 5:

GOES-J MILESTONES

The GOES-J weather satellite to be launched later this month aboard an Atlas 1 rocket will reach a milestone overnight tonight when it will be moved from the Astrotech payload processing facility (Titusville, FL) to Pad B at Launch Complex 36. Tomorrow at 8:30 a.m., the satellite is scheduled to be hoisted into the Pad 36B gantry and mated to the AC-77 rocket. The Atlas 1 launch vehicle itself passed a milestone on May 3 when a Wet Dress Rehearsal was successfully run. The WDR verifies the launch readiness of the vehicle, the launch support equipment at the pad and in the blockhouse, the countdown procedure, and the launch countdown operations of the Eastern Range. During this countdown test liquid hydrogen, liquid oxygen and RP-1 propellants are aboard the vehicle, verifying the structural integrity of the Atlas first stage and Centaur upper stage tanks. The last major prelaunch milestone before actual countdown activities begin is the Combine Electrical Readiness Test, an integrated test between the GOES-J satellite and the AC-77 vehicle currently scheduled for May 9. GOES-J is the second spacecraft to be launched in the new advanced series of geostationary weather satellites for the National Oceanic and Atmospheric Administration (NOAA). The spacecraft has the dual capability providing pictures while performing atmospheric sounding at the same time. The launch is scheduled for Friday, May 19 at the opening of a launch window which extends from 1:42 a.m. to 2:55 a.m. EDT. The GOES-J satellite is built by Space Systems/LORAL (Palo Alto, CA). NASA's Goddard Space Flight Center (Greenbelt, MD) is responsible for the GOES project management. The Kennedy Space Center is responsible for government oversight of the launch vehicle processing activities, integration of the GOES-J spacecraft with the launch vehicle and launch countdown activities. NASA's Lewis Research Center (Cleveland, OH) is responsible for the NASA launch services management role. Lockheed Martin Astronautics (Denver, CO) is under contract to Lewis Research Center to provide the Atlas 1 vehicle and associated launch services. [NASA/KSC News Release No. 40-95, May 5, 1995.]

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SMALL FIRE NEAR ENDEAVOUR

At about 8 p.m., while technicians were working on disconnecting a thruster on **Endeavour**, a right-hand orbital maneuvering system pod in Orbiter Processing Facility

Bay 1, a small fire resulted which was rapidly extinguished. There was no injury to personnel, who were in SCAPE suits, and only minor damage in the area of the fire. The Bay will be closed through the weekend for hazardous operations, i.e., servicing the auxiliary power units. Payload premate testing is set to begin Monday (May 8). SRB stacking operations are starting this week in the VAB. **Columbia**, meanwhile, is powered up and its payload bay doors are open. The eldest Space Shuttle is in OPF Bay 3 where preparations are underway to install the 5th cryogenic tank set and the main propulsion system is being configured for a scheduled system test. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 5, 1995.]

May 4: **CRUCIAL DISCOVERY TEST SET**

A two-day test to verify electrical and mechanical connections between **Discovery** and its external tank/solid rocket booster stack is set to begin May 8. "That is a key test before delivering **Discovery** to the launch pad," said Kennedy Space Center spokesman **Bruce Buckingham**. **Discovery's** rollout to Launch Complex 39B is targeted for early May 11. On May 13, a Tracking and Data Relay Satellite is scheduled to be delivered to the pad for installation into the Orbiter's cargo bay. The \$125 million satellite is designed to keep Shuttle crews in nearly continual communications contact with Mission Control. [Halvorson, **FLORIDA TODAY**, p. 4A, May 5, 1995.]

May 8: **SPACE SHUTTLE PROCESSING UPDATES**

Mating of **Discovery** and its external tank has been completed in the Vehicle Assembly Building where the Orbiter is being readied for rollout to Launch Complex 39B. Today, VAB technicians will conduct Shuttle interface verification tests. At LC 39B, technicians will conduct fueling operations of the STS-70 prime payload, the TDRS-G satellite. **Discovery's** rollout to LC 39B is planned for May 11. Meanwhile, at Launch Complex 39A, the Space Shuttle **Atlantis** continues to be processed for its STS-71 mission, i.e., the historic docking with the Russian Mir Space Station. The mission's main propulsion system helium signature test has been completed. Today, technicians are preparing for prelaunch propellant loading operations and implementing thermal curtain installation on the solid rocket boosters. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 8, 1995.]

May 10: **MISSION SCHEDULE UNCERTAIN**

STS-70 launch time and mission duration will be determined by the Mission Management Team and will be based on the STS-71 launch date, according to Public Affairs spokesman **Bruce Buckingham**. Work continues, however, in processing **Discovery** for a planned June 8 launch. The Shuttle interface verification tests have been completed as well as the Orbiter/external tank electrical mates. Today, technicians are preparing **Discovery** for its rollout to Launch Complex 39B. At the pad, workers are conducting TDRS fueling operations in the pad's payload changeout room. **Atlantis**,

meanwhile, is being readied for its STS-71 mission at Launch Complex 39A. Preparations for prelaunch propellant loading operations have been completed as has the installation of the thermal curtain on the solid rocket boosters. Today, LC 39A workers are preparing the prelaunch hypergolic propellant load operation. The mission's Space Shuttle main engine flight readiness test is planned for May 17-18 and the terminal countdown demonstration test is targeted for May 24-25. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 10, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 12, 1995.]

May 11:

DISCOVERY ROLLS TO LC 39B

Discovery began its STS-70 mission with a rollout to Launch Complex 39B; it started with first motion at 2:37 a.m. Meanwhile, at the pad's Payload Changeout Room, technicians completed fueling operations for the mission's prime payload, the TDRS-G satellite. Preparations have now begun for hot firing APU No. 2. Launch pad validations are also underway. Launch time and duration are still dependent on the STS-71 launch date. **Atlantis**, which will fly the STS-71 mission, awaits that event on Launch Complex 39A. Thermal curtain installation on the solid rocket boosters has been completed and the prelaunch hypergolic propellant load will be undertaken today. In OPF Bay 1, **Endeavour** is being processed for its July 20 STS-69 mission. Auxiliary power units No. 2 and 3 are being removed and replaced as is fuel cell No. 3. Payload premate testing will continue today and preparations are underway to remove the right hand orbital maneuvering system pod next week. Due to un-scheduled OMS pod work, rollover to the VAB will occur on June 20, some five days later than previously targeted. No impact to the July 20 launch date is anticipated. **Columbia**, residing presently in OPF Bay 3, is powered up. Operations to install the 5th cryogenic tank set under the payload bay lining are in work today and the main propulsion system is undergoing a leak and functional check. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 11, 1995; "Shuttle **Discovery** Heads For Launch Pad, **FLORIDA TODAY**, p. 1A, May 12, 1995; Halvorson, **FLORIDA TODAY**, p. 2A, May 12, 1995.]

May 15:

TDRS-IUS PAYLOAD INSTALLED

At Launch Complex 39B, the TDRS-G/IUS-26 payload has been installed in **Discovery**'s cargo bay. Launch pad validations have been completed; hot firing of auxiliary power unit No. 2 has also been completed. Work in progress: IUS/TDRS/**Discovery** interface verification test (IVT); connection of the Orbiter Mid-Body Umbilical Unit [OMBUU]; preparations for the terminal countdown demonstration test and preparations for loading storable hypergolic propellants. Scheduled STS-70 work: terminal countdown demonstration test (May 18-19); storable hypergolic propellant loading (May 22-23) and the flight readiness review (May 26). **Atlantis** is on Launch Complex 39A where storable propellant loading is complete. Preparations are underway for the main engine flight readiness review test (May 17-18) which will precede **Discovery**'s FRR and the STS-71 TCDT set for May 24-25, immediately following that for **Discovery**. **Endeavour**,

in OPF Bay 1, is having its No. 3 fuel cell removed and replaced. Preparations are also beginning for the removal of the right-hand orbital maneuvering system pod. In OPF Bay 3, **Columbia's** main propulsion system leak and functional test is underway. Associated electrical testing is also being performed. Preparations have begun for installing the left-hand orbital maneuvering system pod. Mechanical installation of the fifth cryogenic tank test is complete. Work to establish the electrical connections is beginning today. [SPACE SHUTTLE STATUS REPORT, May 15, 1995.]

May 14:

TITAN LAUNCHED

At 9:45 a.m. a Titan 4 was launched from Cape Canaveral Air Station on a classified Department of Defense mission. The liftoff had been delayed from the previous day to enable the Air Force to check for possible damage caused by a lightning strike last week nearby the launch pad. The launch today was 1 1/2 hours late because of upper-level high winds. This was the first Titan 4 launch of 1995. [Banke, **FLORIDA TODAY**, pp. 1A-2A, May 12, 1995; Banke, **FLORIDA TODAY**, May 14, 1995; Banke, **FLORIDA TODAY**, May 15, 1995; "Titan 4 Rocket Lifts Off With Classified Spy Satellite," **THE ORLANDO SENTINEL**, May 15, 1995.]

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AWARDS FOR KSC EMPLOYEES

Recently, Honoree Awards were given to both contractor and civil service employees at Kennedy Space Center. They are listed below:

CONTRACTOR EMPLOYEES

Joseph E. Fetro

Candice E. Norman

James P. Williams

Fred Governor Jr.

John T. Muzzy, Jr.

Roland J. Brown

John E. Carpenter

John W. Gill

Tim L. LaMunyon

Matthaus J. Atkinson

John D. Holt

Donna K. Jernigan

Edward A. Wilson

Richard H. Davignon

Scott Finnie

Manfred A. Heinrich

William J. Wiegand

Billy D. Shumate

Richard C. Porter

Stan J. Paris

John F. Kowalski

Richard Y. Lyons

Margaret A. Marino

CIVIL SERVICE EMPLOYEES

Rechea H. Hutchinson

Kenneth H. Rosser

T. Steve Taylor

Willie C. Finney

Anton F. Gunde

Dr. Norman W. Murphy

Renee Vanderbrink

Frederick D. Briggs

Lester J. Carleton

Edward A. Horchar

Lester J. Carleton

Jimmy A. Alexander

David J. Dibler

Donald F. Halsema

Alonzo H. Harley

Harry A. Silipo

Lois A. Brusino

Dudley R. Cannon Jr.

Robert W. Webster

J. Dale Stigberg

Fred Jankowski

John E. Meyer

Ronald J. Summers

["NASA Honors 47 KSC Employees," FLORIDA TODAY, May 14, 1995.]

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SEVEN SNOOPYS PRESENTED

Astronaut **Steven L. Smith** recently presented Silver Snoopy Awards to seven KSC employees: **Larry Maggie, Melissa Owens, Yvonne C. Parker, Michael A. Seay, Philip E. Phillips, James Winn and Erik C. Denson.** ["Seven KSC Workers Get Silver Snoopy," FLORIDA TODAY, May 14, 1995.]

May 17:

DISCOVERY OMBUU TESTED

A connection and leak test of **Discovery's** mid-body umbilical unit (OMBUU) has been completed as has a main engine flight readiness test. The Orbiter is at Launch Complex 39B being prepared for its June 8 launch on the STS-70 mission. Work in progress: IUS/TDRS interface verification test; helium signature test of the main propulsion system; preparations for the terminal countdown demonstration test; preparations for loading storable hypergolic propellants and flight crew safety training. STS-70 work scheduled: TDRS-G/IUS-26 end-to-end test; terminal countdown demonstration test; storable hypergolic propellant loading and the May 26 flight readiness test. Engineers are discussing whether a precautionary changeout should be made of the No 3 main engine high pressure fuel turbopump due to a concern about a weld brazing. Should this decision be made there is ample time to make the changeout without any schedule impact to the June 22 target launch date. **Endeavour's** STS-69 mission is to deliver the Wake Shield Facility and Spartan 201-203 to space; it is currently located in Orbiter Processing Facility Bay 1. Preparations are continuing in OPF Bay 1 for the removal of the right-hand orbital maneuvering system pod; changeout of the No. 3 fuel cell is

complete. In the Vehicle Assembly Building, stacking of the mission's solid rocket boosters is continuing. **Columbia's** left-hand orbital maneuvering system pod has been delivered to OPF Bay 3 where the vehicle is being processed for STS-73. Preparations are underway for installing the OMS pod on the third shift tonight. Electrical checkout of the vehicle's main propulsion system is complete. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 16, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 17, 1995.]

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WEATHER MAY IMPACT AC-77 ROLLBACK PLANS

AC-77/GOES-J. The influence of high pressure will be diminishing, increasing the threat of afternoon and evening thunderstorms. This could impact the tower roll-back preparations during the early evening. However, conditions at 10:30 p.m., the time of the actual rollback, should be generally favorable and continue throughout the launch window. [AC-77/GOES-J LAUNCH WEATHER FORECAST, May 16, 1995; AC-77/GOES-J LAUNCH WEATHER FORECAST, May 17, 1995.]

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HYPERGOLIC FIRE INVESTIGATION BOARD

An investigation board, named to look into circumstances surrounding the May 4, 1995, incident which caused a brief fire on **Endeavour's** right-hand orbital maneuvering system pod, will make an interim report of their findings to the media. The board, chaired by **Frank Buzzard**, has been meeting at Kennedy Space Center since being appointed by **Robert B. Sieck**, Director of Shuttle Operations at KSC, soon after the incident. The board was charged with following directives: investigate the facts surrounding the incident, determine its probable cause, assess the possibility of a recurrence, and make recommendations for corrective actions. A final report is expected to be issued by the end of the month. [NASA/KSC Release No. 45-95, May 17, 1995; Borenstein, THE ORLANDO SENTINEL, May 20, 1995.]

May 18:

STS-70 CREW HERE FOR TCDT

The STS-70 crew has arrived to take part in the mission's terminal countdown demonstration test. The five-member crew includes: Commander **Terence T. Henricks**, Pilot **Kevin R. Kregel** and Mission Specialists **Nancy Jane Sherlock**, **Donald A. Thomas** and **Mary Ellen Weber**. Technicians at Launch Complex 39B have completed pad validations for **Discovery's** upcoming mission; the Orbiter mid-body umbilical unit has also been mated to the vehicle. Today, pad workers are conducting the regular helium signature test, a payload/Orbiter end-to-end test and commencing the TCDT which runs through tomorrow. Scheduled STS-70 activities: pre-launch hypergolic propellant load; launch readiness review; flight readiness review; orbiter engine compartment closeouts; payload bay door closing and commencement of the countdown on June 5. [Buckingham, UPCOMING SPACE SHUTTLE MISSIONS [Chart], Jan. 27, 1995.]

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STS-71 PROCESSING UPDATE

Engineers have determined the need to remove and replace the high pressure fuel turbopump on Space Shuttle main engine [SSME] no. . This work is scheduled for early next week and will not impact the target launch date of June 22. **Atlantis'** Orbiter hydraulic connections have been completed as well as the pre-launch hypergolic propellant load. Preparations are underway today to remove and replace the fuel turbopump on main engine number 3. Mean while, preparations are underway to remove and replace the right-hand orbital maneuvering system pod of **Endeavour** early next week. Work to disconnect the pod from the Orbiter is underway. **Endeavour** is in OPF Bay 1. Finally, **Columbia's** left-hand orbital maneuvering system pod has been installed on the Orbiter and connections are currently in work; **Columbia's** processing activities are taking place in OPF Bay 3. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 18, 1995.]

May 19:

STS-70: MISSION DURATION DETERMINATION

Mission Managers have agreed to a 9:26 a.m. EDT launch time for either an 8 or 5 day mission; the STS-70 mission duration will be determined by the Mission Management Team. The STS-70 terminal countdown demonstration test and helium signature tests have both been completed at Launch Complex 39B. Preparations are underway to resume payload end-to-end and interface verification tests on Saturday May 20. In the meantime, processing continues for the STS-71 mission on which **Atlantis** will dock with the Russian Mir Space Station. At Launch Complex 39A, preparations are afoot to remove and replace the fuel turbopump on main engine No. 3. Orbiter-hydraulic connections and the pre-launch hypergolic propellant load have been completed. Both **Endeavour**, for STS-69, and **Columbia**, for STS-73, continue to undergo processing activities in OPF Bays 1 and 3 respectively. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 19, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 22, 1995.]

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KSC MAY LOSE 3150 JOBS IN DOWN-SIZING

By the year 2000, according to NASA Administrator **Daniel S. Goldin**, the space agency will reduce its national work force by 30,000 jobs. "The net effect here is going to be grimmer than the community would like or may have been led to believe," said a senior NASA official on condition he not be identified. Kennedy Space Center will lose 3,150. The civil service workforce will be trimmed by approximately 1,000 or half the present number. KSC Director **Jay F. Honeycutt** said recently, "We'll just have to deal with it. In order to get more reductions, we're going to have to change the way we do business. We already had cut 25 percent out of the shuttle program in the last three or four years. Administrator Goldin hopes NASA can cut 5-10,000 people from the Shuttle work force [all over the country] by having a single prime contractor run the program; Goldin said that safety would not be compromised. Former KSC Director **Forrest S. McCartney**, now

a senior Lockheed official, said "It will certainly be a revolutionary change. It will require new ways of doing business that must be carefully coordinated to assure they maintain the desired level of safety and quality. I believe the Shuttle program has matured to the point where it is appropriate to locate additional operations and maintenance responsibility here, where the hardware is." ["KSC's Honeycutt to Speak On NASA," **FLORIDA TODAY**, May 14, 1995; Banke, **FLORIDA TODAY**, pp. 1A-2A, May 15, 1995; "Leaders Agree On Cutbacks," **FLORIDA TODAY**, p. 1A, May 17, 1995; Halvorson and Banke, **FLORIDA TODAY**, pp. 1A-2A, May 18, 1995; Borenstein, **THE ORLANDO SENTINEL**, May 20, 1995.]

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STATIC ELECTRICITY BLAMED FOR ENDEAVOUR FIRE

Static electricity and procedures which were unclear led to the two-minute fire at the tail end of **Endeavour** when four technicians were removing a leaky thruster on May 4, according to an internal NASA investigation report. Launch Director **Bob Sieck** also speculated that "workers' uncertainty about their future may have also contributed to the human error. Workers were not aware that a pint of volatile chemical remained in the thruster's tubes. Investigation chairman **Frank Buzzard** said that static electricity from a technician's suit traveled onto his wrench and it sparked the fire. NASA is looking into ways to ground tools to reduce static electricity and well as utilizing "some kind of spray that would dissipate static to the air," according to Buzzard. [Borenstein, **THE ORLANDO SENTINEL**, May 20, 1995.]

May 23:

STS-70 STATUS REPORT

At Launch Complex 39B, **Discovery** is being readied for its STS-70 mission. The TDRS-G/IUS-26 interface verification test (IVT) has been completed along with the TDRS-G/IUS end-to-end test. The mission's terminal countdown demonstration test has been completed, too. Today, technicians at the pad are loading storable hypergolic propellants; the pad has been cleared for this hazardous operation. Also beginning today, is the KSC launch readiness review. Ordnance installation is set for May 25; the flight readiness review is set for May 26. **Discovery's** payload bay doors will be closed for flight on June 5. Meanwhile, a 14-story Atlas rocket carrying a \$220 million GOES satellite, was launched at 1:52 a.m. from Cape Canaveral Air Station. The satellite was deployed by ground controllers an hour later. NASA spokeswoman **Lisa A. Malone** said, "Everything is right on schedule, and the satellite is in perfect orbit." [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, May 23, 1995.]

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FLEET PROCESSING UPDATES

Atlantis [STS-71]: The terminal countdown demonstration test (TCDT) is scheduled to begin at 8:00 a.m. on Wednesday and conclude at 11 a.m. on Thursday. The STS-71 astronauts arrived from Houston (TX) yesterday afternoon for the test. Today and tomorrow they are undergoing prerequisite launch safety training. The crew will be

aboard **Atlantis** for the final three hours of the TCDT on Thursday. Initial calibration and alignment of **Atlantis**' inertial measurement units is being performed today. Work to remove and replace the main engine No. 3 high pressure fuel turbopump continues.

Endeavour [STS-69]: Preparations are underway for installing **Spartan** into **Endeavour**'s payload bay on Wednesday. Also tomorrow the Wake Shield Facility will be moved from spacecraft checkout Hangar AE to the Vertical Processing Facility to begin compatibility testing. This will verify the payload's readiness to be integrated with **Endeavour** after reaching the launch pad. **Endeavour**'s right orbital maneuvering system pod will be removed tonight and transported to the hypergolic maintenance facility in the KSC industrial area.

Columbia [STS-73]: The interface verification test [IVT] of the left-hand orbital maneuvering system pod is underway today. Orbiter electrical system validations are continuing. Routine maintenance of the main propulsion system is being performed. [SPACE SHUTTLE STATUS REPORT, May 23, 1995.]

May 24:

STS-70: LRR COMPLETED

The launch readiness review for STS-70 has been completed. The pre-launch hypergolic propellant load is finished and the payload bay doors of **Discovery** are open and ready to receive its prime mission payload - TDRS-G. Workers at Launch Complex 39B are preparing for ordnance installation and inertial upper stage (IUS) flight readiness verification. The flight readiness review takes place tomorrow. Main engine compartment closeouts are scheduled for May 30 while payload bay door closure is targeted for June 5, the day the countdown for STS-70 commences. The duration of the mission remains to be determined by the Mission Management Team. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 24, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 25, 1995.]

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STS-71: DOCKING MISSION UPDATE

The STS-71 crew has arrived for the mission's terminal countdown demonstration test; crew members are: **Robert L. Gibson**, Pilot **Charles J. Precourt**, Mission Specialists: **Ellen S. Baker**, **Gregory B. Jarvis**, **Bonnie J. Dunbar**, Mir 19 Commander **Anatoly Solovyev** and Mir 19 Flight Engineer **Nikolai Budarin**. The Orbiter mid-body umbilical unit has been connected to the vehicle and the pre-launch propellant load has been accomplished. Today LC 39A workers will remove and replace the high pressure fuel turbopump on main engine number 3 and conduct the first day of the TCDT. Meanwhile, **Endeavour** is being processed, OPF Bay 1, for STS-69; the mission is targeted for launch on July 20. The right-hand orbital maneuvering system pod has been removed and tomorrow the replacement pod will be installed. Also, the **Spartan** payload is being installed today. **Columbia**'s pre-STS-73 processing is occurring in OPF Bay 3. The left-hand OMS pod of **Columbia** is being checked-out following installation on the

vehicle. Also, the Orbiter's electrical system validations have been completed. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 24, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 25, 1995.]

May 25:

HONEYCUTT: BUDGET FIGHT LOOMS

"This year is shaping up to be the toughest budget battle we've seen in recent times and perhaps in the entire history of NASA. It's going to take all of us at KSC, Brevard County and the State of Florida to make sure we continue to have a strong presence here," said KSC Director **Jay F. Honeycutt** in remarks to members of the American Institute of Aeronautics and Astronautics meeting in Cocoa Beach. "The delegation needs to better understand the impact of KSC on the economic infrastructure of the entire state. The forces have to be stronger and our voices have to be louder." [Banke, FLORIDA TODAY, May 26, 1995.]

May 26:

STS-70 LAUNCH SET FOR JUNE 8

NASA managers today set June 8, 1995, as the official launch date for Space Shuttle **Discovery** on the STS-70 mission. The STS-70 mission achieves a unique milestone in the history of the American space program as it will mark the 100th human space mission flown by the United States since Alan B. Shepard's historic 15-minute suborbital flight into space in 1961. The primary objective of the STS-70 mission is the deployment of the Tracking and Data Relay Satellite-G, the last in a series of a space-based satellite network that provides communication, tracking, telemetry, data acquisition and command services essential to Shuttle and low-Earth orbital spacecraft missions. **Discovery** and the STS-70 crew are scheduled to be launched into a 160-mile circular orbit during a two-hour 30 minute window which opens at 9:26 a.m. EDT on June 8. The mission is scheduled for seven days, 22 hours and 10 minutes but Shuttle officials may shorten the flight to five days depending on when the mission actually begins so that the next Shuttle mission - a historic link-up with the Russian Space Station **Mir** - can be launched on or about June 22. An on-time STS-70 launch and full eight day mission would result in a June 16 landing at the Kennedy Space Center at 7:30 a.m. EDT. About **Discovery** will be a five-person crew commanded by two-time Shuttle Commander **Terence Tom Henricks**, Pilot **Kevin Kregel**, and Mission Specialists **Donald A. Thomas**, **Nancy Curie** and **Mary Ellen Weber**. This will mark the first space journey for both Kregel and Weber. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 26, 1995; NASA/KSC News Release No. 49-95, May 26, 1995; Halvorson, FLORIDA TODAY, May 27, 1995.]

May 29:

SENATOR WANTS SHUTTLE ENGINE PROBE

Senator **Charles Grassley** (R-Iowa) intends to investigate problems with the Space Shuttle Main Engines; he will focus on the turbopumps which have long been though a weak link in the Shuttle. Allegations have been made that Rocketdyne has been using

unqualified workers to inspect the pumps at the plant which makes them. Grassley said, "We need to send the message loud and clear that sloppy inspections are 'Shuttle Enemy No. 1.'" NASA spokesman **Brian Welch** reacted to the proposed inquiry by saying, "Our bottom line is that if it is not safe, we are not going to fly it, and if it's not safe, we want to know that." ["Official Wants Probe Into Shuttle Engines," **THE ORLANDO SENTINEL**, May 30, 1995.]

May 30: STS-70: FLIGHT READINESS REVIEW COMPLETED

At Launch Complex 39B, **Discovery's** STS-70 flight readiness review has been completed, along with inertial measurement unit calibrations and part 1 of the ordnance installation operations. Today, aft engine compartment closeouts, countdown preparations and TDRS battery charging operations will be undertaking. Meanwhile, one pad over, at Launch Complex 39A, **Atlantis** awaits its June 22 launch. Leak checks on the vehicle's high pressure fuel turbopump on main engine number 3, the terminal countdown demonstration test and inertial measurement unit calibrations have been completed. Today, pad workers will ready **Atlantis** for its helium signature test. **Endeavour** continues to be processed for its STS-69 flight in Orbiter Processing Facility Bay 1. **Endeavour's** STS-69 mission is scheduled to commence on July 20; in the meantime, it is being processed for flight in OPF Bay 1. **Endeavour's** right-hand orbital maneuvering system pod is being connected to the Orbiter today. In the VAB, preparations are in work to mate the external tank with the mission's solid rocket boosters tomorrow. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, May 30, 1995.]

May 31: WOODPECKER DAMAGE TO EXTERNAL TANK

STS-70 Mission Managers are assessing minor damage to the external tank of STS-70 which was caused by nesting Flicker Woodpeckers. The damage, to date, consists of about 71 holes (ranging in size from 4 inches in diameter to 1/2 inch in diameter) in the ET's thermal protection foam insulation. Technicians are currently installing safeguards against additional damage. Managers are assessing the damage and will determine what repairs, if any, need to be made. The mission's flight readiness review has been completed as have inertial measurement unit calibrations and the first part of ordnance installation operations. Today, pad workers are making aft engine compartment closeouts; countdown preparations and TDRS batter charging. Installation and checkout of contingency spacesuits and closing of the payload bay doors are on the scheduled for next week. Countdown for STS-70 is targeted for June 5; the mission's crew is expected to arrive at KSC in the early evening also on June 5. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, May 31, 1995; Burnett, **THE ORLANDO SENTINEL**, June 1, 1995; Halvorson, **FLORIDA TODAY**, June 1, 1995.]

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X-RAY TIMING EXPLORER ARRIVES

NASA's X-Ray Timing Explorer [XTE] to be launched aboard a Delta II rocket late this summer arrived today at the Skid Strip on Cape Canaveral Air Station aboard a C-5 military transport jet. The spacecraft was shipped from NASA's Goddard Space Flight Center [Greenbelt, MD]. The purpose of the XTE Satellite is to gather data with its three instruments about X-Ray emitting objects within our Milky Way Galaxy and beyond. The spacecraft will provide information on the nature, energy source and evolution of X-Ray sources such as white dwarfs, neutron stars and black holes. The 6,700-pound XTE is being transported today to NASA Spacecraft Checkout Hangar AO on Cape Canaveral Air Station to begin approximately two months of activities. This will include completion of payload element integration, functional tests, spacecraft batteries. In mid-August XTE will be transported to Pad A at Complex 17 for mating to the Delta II rocket. Delta/XTE is currently scheduled for launch on August 31, however, due to launch vehicle availability this date is under review. [NASA/KSC News Release No. 47-95, May 31, 1995.]

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STS-71: DOCKING MISSION

At Launch Complex 39A, pad technicians have installed and leak checked the high pressure fuel turbopump on main engine number 3 and made inertial measurement unit calibrations. Today, the mission's helium signature leak test on main engine number 3 is being conducted and the main engine heatshields are also being installed. On June 1, a main engine flight readiness test will be performed; the flight readiness review will follow the next day. Orbiter engine compartment closeouts will commence June 6. Meanwhile, in OPF Bay 1, **Endeavour** is being readied for its STS-69 mission. The right-hand orbital maneuvering system pod has been connected to the Orbiter and preparations are in work to install the main engines on June 2. In the VAB, preparations are in work to mate the external tank with the solid rocket boosters today. **Columbia** is in OPF Bay 3, where fuel cells no. 2 and 3 are being prepared for installation into the Orbiter. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, May 31, 1995.]

JUNE

June 1:

MILITARY/CIVILIAN SATELLITE COMBINE PROPOSED

The Clinton Administration has taken a major step toward combining the country's military and civilian weather satellite programs into a single system - a move that is expected to save American taxpayers up to \$300 million through 1999, with additional savings through the life of the program. Secretary of Commerce **Ronald H. Brown**, Secretary of Defense **William J. Perry**, and NASA Administrator **Daniel S. Goldin** signed a formal agreement on May 26, establishing the agencies' roles and responsibilities in support of the new system and implementing a Presidential Decision Directive that was signed last year. "Combining these programs was a key recommendation of Vice President Gore's National Performance Review," said Under Secretary of Commerce for Oceans and Atmosphere **D. James Baker**. "The new program will result in a major reduction of acquisition, operational and facilities costs." Currently four U.S. polar-orbiting satellites are used to collect operational, meteorological, oceanographic, climate and space environment data. Two satellites are provided and operated by the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), and two by the Department of Defense's Defense Meteorological Satellite Program. The new combined program will consist of three satellites. The first satellite under the new system, called the National Polar-Orbiting Operational Environmental Satellite System [NPOESS], is expected to be launched in 2006. To acquire and operate the NPOESS, the Department of Defense, NASA and NOAA have established an Integrated Program Office. **James T. Mannen**, a retired Air Force Colonel with extensive experience in space programs, was named Director of the office on May 30. The signing of the agreement by the three agencies represents a tangible and significant step forward in interagency cooperation - merging operational military and civilian systems, while still satisfying each agency's critical mission requirements and doing so at reduced cost to American taxpayers. [NASA/KSC Press Release No. 95-82, June 1, 1995.]

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NORTHERN FLICKER WOODPECKERS AT 39B

STS-70 Mission Managers continue to assess damage to the external tank of STS-70 caused by Northern Flicker Woodpeckers. As many of 78 holes up to four inches in diameter have been counted in the ET's thermal protection foam insulation. Overnight, workers moved several cranes out to the launch pad to reach the damaged areas of the tank. Repairs are in work today on the more easily accessible locations. A 250-foot crane with a long boom attachment will be in place on the pad surface tomorrow to allow access to the higher areas of the tank. Managers will discuss today a timeline required for work to be completed. Current estimates indicate a one or two day delay is possible, based on the time required to perform the necessary repairs. Ordnance installation operations have been completed. Today, workers are making repairs to the external tank's foam insulation, closing out the aft engine compartment, making countdown preparations and installing and checking-out contingency spacesuits. The

payload bay doors are expected to be closed for flight on June 5. Countdown commences June 5 at 6:00 a.m. and the STS-70 crew arrives for launch at 6:00 p.m. the same day. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 1, 1995.]

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STS-71: HELIUM SIGNATURE TEST FINISHED

At Launch Complex 39A, pad workers have completed **Atlantis'** helium signature test and made inertial measurement unit calibrations. Today, main engine heatshields will be installed and a main engine flight readiness test will be conducted. In OPF Bay 1, **Endeavour** is being readied for its July 20 STS-69 mission on which it will deploy both the Wake Shield Facility 2 and Spartan 201-203. Preparations are in process to install the Space Shuttle main engines beginning tomorrow. In the VAB, the external tank for the mission has been mated to the solid rocket boosters and electrical connections are being made. Meanwhile, in OPF Bay 3, **Columbia's** fuel cells No. 2 and 3 will be installed into the vehicle. The extended duration Orbiter (EDO) pallet is being prepared for installation tomorrow. **Columbia's** STS-73 mission's primary cargo is the U.S. Microgravity Laboratory-2. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 1, 1995.]

June 2:

LAUNCH DATES NOT SET YET

NASA Managers have decided to delay the launch of Space Shuttle **Discovery** on Mission STS-70 in order to make repairs to foam insulation on the vehicle's external fuel tank. Earlier this week, technicians at Launch Complex 39B discovered that woodpeckers had inflicted about six dozen small holes in the insulation material. Due to the critical role the insulation plays from a thermal standpoint during the Shuttle's launch and ascent, and the tank's re-entry into the atmosphere, it was determined that the damaged areas must be fixed prior to flight. After evaluating the location and nature of the areas in question, it was determined the repairs should be performed in the Vehicle Assembly Building. This is due to access and environmental concerns at the launch pad. Technicians will now begin preparations for **Discovery's** rollback to the VAB which may take place the week of June 5. The insulation repair work should take less than a week to complete. Upon completion of the insulation work, **Discovery** will be moved back to the launch pad for final vehicle preparations. The TDRS/TUS payload will be removed prior to rollback. With the rollback decision on **Discovery**, Space Shuttle **Atlantis** on Mission STS-71, the first Shuttle-Mir mission, will probably be the next mission flown. The STS-71 mission is scheduled for launch during the third week of June. An official launch date is expected to be announced late next week. A launch date was not selected at the conclusion of today's Flight Readiness Review due to ongoing work aboard the Mir station that needs to be completed prior to **Atlantis'** arrival. The launch team at the Kennedy Space Center will continue vehicle processing work so that **Atlantis** will be ready for launch anytime on or after June 22. Shuttle Managers are considering various manifest options in terms of which mission will follow the STS-71

flight. There is a flight opportunity scheduled for mid-July and initial indications show another flight could be done in mid-August. STS-71 is the first of seven planned Space Shuttle-Mir missions between 1995 and 1997, including rendezvous, docking and crew transfers, which will pave the way toward assembly of the international Space Station beginning in November 1997. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, , June 2, 1995; NASA/KSC News Release No. N95-36, June 2, 1995.]

June 2:

WOODPECKERS AT LC 39B

There is no knowledge of previous incidents of wildlife impacting a launch to the [degree to which the woodpeckers have impacted STS-70]. Records will continue to be searched for other previous incidents regarding wildlife. Closed circuit TV tapes have been reviewed and wildlife experts have concluded that there were at least two woodpeckers at Pad B, probably not more. The birds might have been trying to build a nest, searching for food, or drumming to show territory - it is not clear at this time. On May 31, wildlife personnel performed a 2-hour walkdown of the pad. They saw no woodpeckers, nests, eggs or hatchlings. They recommended that 2 dead cabbage palms about 20 feet north of the pad perimeter fence be checked, and nothing was found there either. They also identified potential nesting cavities - probably made by birds but wildlife personnel were not sure when - in several wooden posts inside the fence. These posts are being removed. Wildlife personnel did not see nests at Pad B, but were told that there are Starling nests there. Most of the time it is all but impossible to reach these nests. Nesting materials on the gaseous oxygen vent swing arm have been recently noted, but no birds observed in the nest. Wildlife personnel believe the woodpeckers are gone from the pad. There have been no calls regarding birds at Launch Complex 39A where *Atlantis* is poised for launch on Mission STS-71 in late June. [Buckingham, "RTQ: Northern Flicker Woodpeckers at Launch Pad 39-B STS-70, *Discovery*, June 2, 1995.]

June 5:

TDRS-G/IUS-26 STATUS REPORT

The STS-70 payload test team this afternoon began implementing a schedule which would preserve an option for Space Shuttle *Discovery* to roll back to the Vehicle Assembly Building as early as Thursday. At this time the batteries of the Inertial Upper Stage (IUS) are being disconnected and the TDRS batteries are being discharged. Later tonight the Redundant Inertial Measurement Unit (RIMU), the primary guidance and navigation system of the IUS, will be removed. An IUS shock recorder will be installed. All payload disconnections should be complete by 9:30 a.m. Tuesday. Work will begin to extract the TDRS/IUS payload from *Discovery*'s payload bay starting at 10:00 a.m. Tuesday. The payload should be fully removed and installed in the payload changeout room at Pad 39B by 6 p.m. Tuesday. Protective covers will be installed over the solar panels early Wednesday. No further work will be performed on TDRS/IUS until the new launch schedule has been determined. If a decision is made to launch *Discovery*

in August, the TDRS/IUS stack will be returned to the Vertical Processing Facility (VPF) in the KSC Industrial Area. It will not be necessary to offload the attitude control propellant which is aboard the satellite. The payload test team is currently discussing what additional checks, if any, would be appropriate while in the VPF. Once **Discovery** has returned to the launch pad and the TDRS/IUS reinstalled into the payload bay, an interface verification test (IVT) will be performed. Whether another end-to-end communications test is necessary is under discussion. [**TDRS-G/IUS-26 Payload Status Report**, June 5, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, June 5, 1995.]

June 6:

STS-71: LAUNCH DATE NOT SETTLED

Mission managers have not selected an official launch date due to ongoing work aboard the Mir Space Station that needs to be completed prior to **Atlantis'** arrival. The KSC launch team will continue vehicle processing for launch no earlier than June 22. An official launch date is expected to be announced next week. The mission's main engine flight readiness test and flight control tests have been completed. In addition, the main engine heatshields have been installed. LC 39A Pad technicians will be making auxiliary power unit pressure checks today and preparations for aft engine compartment closeouts which begin tomorrow. Meanwhile, workers at Launch Complex 39B are preparing the Shuttle **Discovery** for rollback to the Vehicle Assembly Building beginning at 3:30 a.m. Thursday. The decision to go back to the VAB was made in order to repair damage done by woodpeckers in the foam insulation of the external tank. It is estimated that about six days will be needed to repair the woodpecker holes once access is gained to the external tank in the VAB. The TDRS payload needs to be disconnected from **Discovery** and the Satellite moved from the cargo bay to the payload changeout room. In OPF Bay 1, technicians are preparing to install **Endeavour's** main engines beginning Wednesday. Due to previous delays associated with removing and replacing the orbital maneuvering system pod, rollover to the VAB will be delayed approximately six days. In OPF Bay 3, workers are preparing to install the extended duration Orbiter pallet into the cargo bay of **Columbia** for the vehicle's STS-73 mission which is planned for September 21. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, June 6, 1995.]

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RUSSIAN DOCKING MODULE TO ARRIVE

The primary payload for Space Shuttle mission STS-74, the Russian Docking Module, arrived at the Kennedy Space Center on Wednesday, June 7 at 10:40 a.m. The Russian Docking Module will be attached to the MIR Space Station as an Orbiter interface for the remaining six Space Shuttle rendezvous flights after STS-71. "This is a major operational hardware exchange between the United States and Russia," said **Tommy Holloway**, Manager of NASA's International Space Station Phase One Program Office. "As we move into the Space Station era, these equipment exchanges will become almost commonplace. This particular hardware also is very important to the reconfiguration of

Mir for future joint operations." This will be the first payload to be prepared for launch in Kennedy Space Center's new Space Station Processing Facility (SSPF). The Russian Docking Module and a pair of solar arrays for the MIR Space Station will arrive at the KSC Shuttle Landing Facility aboard an Aeroflot Antonov-124 aircraft, a Russian air cargo plane. It is approximately equivalent in size to an Air Force C-5. Approximately 50 Russian personnel will be at KSC over the next several months for the final assembly and testing of the Russian Docking Module. In late August the module will be turned over to the STS-74 payload test team at Kennedy Space Center and transferred to the Operations and Checkout Building. There it will undergo a series of tests verifying its readiness and compatibility with the Space Shuttle **Atlantis**. The Russian Docking Module will be installed into the payload bay of **Atlantis** at the Orbiter Processing Facility the first week of September and integrated Orbiter/payload testing will follow. Launch of STS-74 with **Atlantis** and the Russian Docking Module is currently scheduled for late October. [NASA/KSC News Release No. 51-95, June 6, 1995; NASA/KSC News Release, June 8, 1995.]

June 7:

DISCOVERY/ENDEAVOUR LAUNCH DATES SET

NASA Managers have set new target launch dates for two Shuttle missions scheduled to fly this summer. Space Shuttle **Discovery** on Mission STS-70 is now targeted for launch on July 13 and Space Shuttle **Endeavour** should be launched on Mission STS-69 on July 30. Mission Managers plan to select an official launch date for **Atlantis** early next week. Launch remains planned for no earlier than June 22. The new flight dates for **Discovery** and **Endeavour** have no impact to the processing work on Space Shuttle **Atlantis** being prepared for the STS-71 launch on the first Shuttle-Mir docking mission. The **Atlantis** launch remains planned for no earlier than June 22 and a firm launch date should be announced early next week. The new target dates for **Discovery** and **Endeavour** were established after the launch team finished assessing the impact of last week's decision to roll **Discovery** off Launch Pad 39B. The rollback was required in order to make repairs to the foam insulation on the external tank. The tank had been damaged by holes pecked through the insulation by Northern Flicker Woodpeckers. [NASA/KSC Note to Editors: 95-39, June 7, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 7, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 8, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 9, 1995.]

June 12:

STS 71: LAUNCH DATE TO BE SET

Mission Managers for STS-71 plan to select an official launch date for **Atlantis** this week. Launch remains planned for no earlier than June 22. Pad technicians have installed the STS-71 contingency spacesuits. Today, they will conduct aft engine compartment closeouts; checkout of the contingency spacesuits and countdown preparations. Ordnance operations are targeted for June 14 with complete aft engine compartment closeouts planned for June 16. In the Vehicle Assembly Building, work

continues steadily to repair holes in **Discovery's** STS-70 external tank by nesting Northern Flicker woodpeckers. Managers believe that most repairs should be completed by Wednesday supporting a possible return to the launch pad as early as Thursday, June 15. In OPF Bay 1, **Endeavour** is being prepared for its STS-69 launch, tentatively targeted for July 30, with a 2 1/2 hour launch window. Over the past weekend, work to install **Endeavour's** main engines was completed. Securing operations are in progress this week. Finally, in OPF Bay 3, the extended duration Orbiter [EDO] pallet has been installed into the Orbiter's payload bay. The forward reaction control system will be installed on the Orbiter tomorrow. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 12, 1995.]

June 13: RUSSIAN SPACEWALK KEY TO STS-71 LAUNCH DATE

Mission managers plan to select an official launch date for **Atlantis** [STS-71] later this week following a key spacewalk by Russian cosmonauts to inspect a set of solar arrays on the Mir Space Station. Launch at this time is planned for no earlier than June 23. The contingency spacesuits have been installed in the Orbiter and will be checked out today. Other activities occurring today: aft engine compartment closeouts; Orbiter airlock closeout; countdown preparations. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 13, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 14, 1995.]

0 GOLDIN RESPONSE TO GAO REPORT

"The GAO's annual audit of the International Space Station program proves, once again, that the International Space Station Program is on schedule and under budget," said NASA Administrator **Daniel S. Goldin** today. "The GAO has validated our cost estimates for the design, development, on-orbit assembly and operations of the International Space Station." GAO reports that the estimate to design and build the station has remained constant at \$17.4 billion, and the estimate for ten years of operations is still \$13.0 billion. While the GAO and NASA agree on these figures, the GAO makes other assertions with which NASA does not concur. For example, the report implies that the Space Shuttle program will have difficulty meeting the Space Station assembly schedule. "I have full confidence," Goldin responded, "that the Shuttle Program can meet the Space Station's launch requirements on time and within budget. The Space Station is not a paper program anymore. We are building it. We have completed over 48,000 pounds of hardware to date." The General Accounting Office's Space Station life cycle cost estimate of \$93.9 billion includes \$50.5 billion for Shuttle transportation costs. NASA would require still more funding for the Space Shuttle if the Space Station were canceled. Furthermore, over fifty percent of the funding for research conducted under the Life and Microgravity Sciences and Applications program is included in the Station budget. Prior costs for other Station designs and civil service salaries also are included in the GAO estimate.

"In this time of austere budgets, we must be very careful how we characterize NASA's funding," Goldin said. "These figures are not new. They are based on the average cost of a Shuttle flight. However, to suggest that these funds would be saved if Station were terminated is incorrect. NASA is firmly committed to human exploration of space, and we would still fly the Space Shuttle if the Space Station were canceled." The GAO Report did mention that the Space Station is under budget and on schedule. Goldin stressed that "the program has made a year of solid progress since their last report." Some of the program's accomplishments over the past year include:

- * Completing every major milestone on time.
- * Signing the Boeing prime contract for \$5.63 billion, about \$600 million less than originally estimated.
- * Building over 48,000 pounds of hardware to date, with over 75,000 to be completed by the end of 1995.
- * Signing the FGB protocol and successfully completing the FGB Critical Design Review.
- * Flying a successful rendezvous between the Space Shuttle and the Mir Space Station.
- * Launching Norman E. Thagard on his historic stay aboard Mir.

[NASA/KSC News Release No. 95-92, June 13, 1995; Holton, THE ORLANDO SENTINEL, July 3, 1995.]

June 15:

JAPANESE SCARECROW AT LC 39B

"We don't want to be caught in a woodpecker-rich environment unprotected," said **Steve Altemus**, head of NASA's Bird Investigation Review and Deterrent Team. The team was formed to combat the activities of Northern Flicker Woodpeckers who have been wreaking havoc with **Discovery's** external tank; they've pecked nearly 200 holes in the insulation covering the tank. **Jack** and **Mary Tepoorten** gave NASA two Japanese scarecrow balloons to frighten away the troublesome woodpeckers. The Tepoortens operate Bird Scare Predator EyeInc. [Little Canada, MN]. The balloons, one each for LC 39A and 39B, sport six pairs of menacing predatory eyes and are commonly used as scarecrows in Japan. Meanwhile, in the Vehicle Assembly Building, repair work has been completed on the holes drilled by woodpeckers in the foam insulation. The vehicle was returned to Launch Complex 39B early this morning. [Halvorson, FLORIDA TODAY, p. 5A, June 15, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, June 15, 1995.]

June 19:

LIFE SCIENCES ON WORLD WIDE WEB

Beginning today on the Internet, computer users will be able to access the first stage of a NASA data archive that eventually will provide the wealth of scientific knowledge developed from 30 years of space-based research into the effects of microgravity on the

human body. The Life Sciences Data Archive [LSDA] contains overview information on the 18 experiments conducted on the Spacelab Life Sciences-1 mission that flew on board the Shuttle June 1991. As the system grows and matures, information from other life sciences research conducted on other missions, such as the International Microgravity Laboratory flights, Spacelab-Japan and Spacelab Life Sciences-2, will be included. "We have a great deal of valuable information in our life sciences archive," said **Geny Taylor**, Project Manager of the Life Sciences Data Archive and staff scientist in the Life Sciences Program Integration Office at the Johnson Space Center [Houston, TX]. "Now people will be able to learn about the research we have done and how it has direct applications to their own quality of life here on Earth." The Life Sciences Data Archive may be found at http://nssdc.gsfc.nasa.gov/life/nssdc/life_home.html. [NASA/KSC Release No. 95-97, June 19, 1995; "NASA Blasts Into World Wide Web With Full Force," FLORIDA TODAY, July 5, 1995.]

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STS-71: LAUNCH SET FOR JUNE 23

Mission manager selected Friday, June 23, as the official launch date for **Atlantis** on mission STS-71. The countdown for launch will begin at 9:30 a.m. Tuesday for a 7 minute launch window opening at 5:08.37 p.m. on June 23. Docking with Russia's Mir Space Station will occur on Monday, June 26, at about 10:30 a.m. and landing will be at about 12 noon July 4. Meanwhile, at Launch Complex 39A, technicians have completed aft engine compartment closeouts. Countdown preparations and potable water sampling are underway today. The STS-71 crew is expected to arrive at 4:30 p.m. tomorrow. The rotating service structure will be moved to launch position on June 22 at approximately 8:30 p.m. External tank loading operations begin at 7:45 a.m. June 23. Daily countdown briefings for the press begin tomorrow. The STS-71 crew includes Commander **Robert L. Gibson**, Pilot **Charles J. Precourt**, and Mission Specialists: **Ellen S. Baker**, **Gregory J. Harbaugh** and **Bonnie J. Dunbar**. Mir crew members include American astronaut **Norman E. Thagard** and Mir Cosmonauts: **Vladimir Dezhurov** and **Gennady Strekalov**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 16, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 19, 1995; NASA/KSC News Release No. 95-95, June 16, 1995; NASA/KSC News Release No. 56-95, June 19, 1995; NASA/KSC NOTE TO EDITORS: N95-4, June 19, 1995, NASA/KSC Release No. 55-95, June 19, 1995.]

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STS-70 PROCESSING UPDATE

Discovery is ensconced upon its mobile launcher platform at Launch Complex 39B and undergoing pre-launch processing activities. Technicians have completed pad validations, installed the TDRS satellite into the Orbiter's payload bay and conducted Orbiter mid-body umbilical unit mate and leak checks. Today, TDRS interface verification testing will be implemented. The STS 70 main engine flight engine readiness test is scheduled for June 16. **Endeavour**, whose next mission is STS-69, is in OPF Bay 1 where closeouts of the Orbiter's mid-body and aft engine compartment

continue today. The payload bay doors will be closed today. **Endeavour** will deploy the Wake Shield Facility-2 and Spartan 201-203. The STS-69 mission is targeted for August 10. **Columbia's** STS-73 mission to deploy the U.S. Microgravity Laboratory-2 is scheduled for September 21. The Orbiter is presently in OPF Bay 3. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 19, 1995.]

June 20:

WEATHER MAY DELAY ATLANTIS LAUNCH

The much-delayed STS-71 mission of **Atlantis** faces the prospect of another delay on June 23. Forecasters are citing several Brevard County low-pressure systems which will bring afternoon showers for the rest of the week. That makes for a 30% chance that **Atlantis** will be able to liftoff at 5:08 p.m. Friday (June 23). The window lasts only a few minutes. "Seven minutes just isn't long enough to allow any dynamic weather to clear out and allow the Shuttle to launch," said KSC spokesman **George H. Diller**. A more precise forecast will be available on June 22. Mission managers are, according to Diller, looking at ways "to make it easier to launch while still maintaining safety." Despite the questionable weather, the STS-71 astronauts are expected to arrive today at Kennedy Space Center from Houston. [Banke, **FLORIDA TODAY**, p. 1A, June 20, 1995.]

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ADMINISTRATOR'S STATEMENT ON REDUCTIONS

[The following statement from NASA Administrator **Daniel S. Goldin** on the proposed cuts to the Agency's Mission to Planet Earth program was released today through the President's Office of Science and Technology Policy.....]

The House of Representatives has approved a FY 96 budget resolution which assumes a massive reduction over the next five years to NASA's efforts to study the Earth - Mission to Planet Earth. Such a cut would dismantle the national approach to U.S. global change research priorities established over the last three Administrations and undercut U.S. leadership in this important area of research. It would destroy this program's basic feature -- comprehensiveness -- and turn an integrated, global program into a series of disconnected and fundamentally less effective measurements. Worse still, it would condemn American scientists to pursuing an approach to environmental research that is more than a decade out of date. The cuts would cripple the core of the program - the Earth Observing System [EOS] - the first integrated satellite and research system designed to observe the linkages among all the components of the Earth system -the land, oceans, atmosphere, ice sheets, and ecosystems. Understanding these linkages is the critical next step to unlocking the secrets of how the environment works and how it affects us all.

NASA's approach to EOS converges both scientific and practical interests. First, the same instruments will collect data of significant value to both communities, as demonstrated by more than two successful decades of Landsat information. Second,

scientists recognize that they must be able to translate their research down to the regional level to truly understand global climate effects. Practical users need regional information, as well as its global context. Most importantly, the EOS data will be used to forecast the climate - a year in advance at first, then progressively longer. The ability to make reliable regional and global climate forecasts will have a profound impact on society. Such forecasts are key to major improvements in agricultural and urban planning, water and forest management, investment and capital decisions, and fishing, all of which fundamentally affect U.S. competitiveness. They would also enable improvements in our ability to predict and react to natural disasters, like floods and hurricanes, thereby preventing greater loss of life and property. All of these gains would be lost if the proposed cuts to EOS are sustained. The U.S. government - in partnership with scientists, private companies, and other nations - must ensure that this cutting-edge research that is the foundation of Mission to Planet Earth is continued. Government leadership in this science and technology innovation is the key to enabling the broad commercial contributions foreseen by many, in the environmental field and realizing numerous benefits for science, commerce, and policy. NASA has always been at the forefront of such advances in knowledge and we stand committed to this effort. By walking away from the systematic and comprehensive approach for Mission to Planet Earth, the U.S. would also give up its undisputed world leadership in Earth observations, jeopardizing technologies which will be critical to the growing commercial remote sensing market, and reduce our ability to influence the global environmental agenda. Significant U.S. investment in environmental science is the key to preserving this impartiality among nations and sustaining U.S. economic competitiveness in the global marketplace. We at NASA are all committed to prudent and permanent deficit reduction. Recognizing our fiscal responsibility, NASA has already made enormous reductions in our future budgets. However, further cuts to Mission to Planet Earth - and environmental research in general - seriously jeopardize an investment in the future that will return economic and quality of life benefits far in excess of what we spend today. [NASA/KSC News Release No. 95-99, June 20, 1995.]

June 21:

STS-71: STATUS REPORT

The countdown for launch began at 9:30 a.m. EST today for a 7-minute launch window opening at 5:08.46 p.m. EST on June 23. Docking with Russia's Mir Space Station will occur on Monday, June 26, at about 10:12 a.m. and the hatch will open at about 12:33 p.m. The Orbiter will undock from Mir at about 8:28 a.m. on Saturday, July 1 and land at Kennedy Space Center's Shuttle Landing Facility at about 12:04 p.m. July 4. Countdown preparations have been completed and the aft engine compartment has been closed. Today, technicians continued potable water sampling, began final vehicle and facility closeouts for launch and started preparations for servicing fuel cell storage tanks. The crew is expected to arrive at 4:30 p.m. The STS-71 crew includes Commander **Robert L. Gibson**, Pilot **Charles J. Precourt**, Mission Specialists: **Ellen S. Baker**, **Gregory J. Harbaugh** and **Bonnie J. Dunbar**. Mir Cosmonauts include Mir 19 Commander **Anatoly Solovyev**, Flight Engineer **Nikolai Budarin**, Mir 18 Commander **Vladimir**

Dezhurov, Flight Engineer Gennady Strekalov and Mir 18 Cosmonaut-Researcher Norman E. Thagard. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 20, 1995.]

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TITOV TO PLANT TREE

Vladimir Titov, STS 63 Mission Specialist, Russian Space Agency, will plant a tree at Kennedy Space Center today to commemorate his flight aboard the Shuttle **Discovery** in February. Titov will plant a Cherry Laurel tree. In keeping with Russian tradition, Sergei Krikalev, the first cosmonaut to fly aboard the Shuttle, planted a tree in the same vicinity last year following his flight on STS-60. [NASA KSC Release, June 21, 1995.]

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SHUTTLE HOME PAGE

With the countdown underway for this week's planned launch of the Shuttle **Atlantis**, NASA is unveiling a permanent home on the Internet for Shuttle mission information. "On Board STS-71," focusing on the **Atlantis**-Mir docking flight, will be the maiden voyage of the official NASA source for World Wide Web information about all Space Shuttle missions. The page also will feature five spectacular new images of Russia's Mir Space Station, available to the media from NASA Headquarters and to computer users via the Internet on Wednesday June 21. The pictures are being released to help illustrate the upcoming docking of the Space Shuttle **Atlantis** to the Mir space station. The high resolution images show Mir over the Pacific Ocean and were recorded using the IMAX Cargo Bay Camera during the STS-63 rendezvous mission on February 6, 1995. The IMAX images and other information on STS-71 can be accessed at the following URL: <http://shuttle.nasa.gov>; there are links to other NASA information as well. The Kennedy Space Center Newsroom is expanding its boundaries into the Internet, as well. A wealth of information on the Space Shuttle and other NASA programs is now easily accessible online [at URL: <http://www-pao.ksc.nasa.gov/kscpao/kscpao.htm>]. the page will link users to such topics as Shuttle Launch Schedules, Daily Status Reports, A Space Shuttle Mission Chronology, online versions of NASA Fact Sheets and other services available to educators and schools. The page will also link to an archive of KSC-issued Press Releases dating eventually back to the early 1960's. A link to KSC Library and the KSC Library Archives may be found on the Kennedy Space Center Home Page at [<http://www.ksc.nasa.gov/ksc.html>]. Demonstrations of both the Shuttle Mission Home Page and the KSC Newsroom Home Page are planned for June 22 following the L-1 Press Conference. [NASA/KSC Internet Advisory: 195-8, June 20, 1995.]

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STS-71: COUNTDOWN CONTINUES

The countdown for mission STS-71 and the launch of **Atlantis** on Friday continues today. The countdown began yesterday at 9:30 a.m. at the T-43 hour mark. Late yesterday, engineers monitoring the pressure of a reaction control system helium tank in the right-hand orbital maneuvering system pod, noticed a decay in pressure of about a half psi per

hour. A leak check revealed the most probable source to be a fitting on the fuel supply helium tank serving the right-hand reaction control system. After the pad reopens, following the loading of the onboard cryogenic tanks later this afternoon, that fitting will be inspected and additional leak checks made....Tomorrow, preparations will be made to retract the rotating service structure to launch position at about 8:30 p.m. Loading of the external tank with cryogenic propellants is scheduled to begin at about 7:45 a.m. Friday. Air Force weather forecasters are currently indicating a 70 percent probability of weather prohibiting launch on Friday. The primary concerns are for showers and thunderstorms. During Friday's launch window, the winds at Pad A are expected to be from the east-southeast at 12-16 knots; temperature 80 degrees F; visibility 7 miles; and clouds scattered at 3,500 and 7,000 feet, broken at 25,000 feet. The 24-hour-delay forecast reveals similar conditions and a 70 percent chance of violation. The seven-member astronaut crew arrived at KSC's Shuttle Landing Facility at 4:30 p.m. Tuesday. Today, they will be involved with checking out their mission plans and fit checks of their equipment. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 21, 1995; Halvorson, FLORIDA TODAY, pp. 1A-2A, June 22, 1995.]

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RE: WOODPECKERS & HOLES

There have been some conflicting reports in the press lately regarding the woodpeckers and **Discovery** on mission STS-70. As of late last week, the final woodpecker hole repair count stands at 195. The repairs have been completed and the vehicle was returned to Launch Complex 39B on June 15. There have been no reported sightings of woodpeckers on or near **Atlantis** at pad 39A and no more reported woodpecker sightings on **Discovery** since the problem first came to light over the Memorial Day weekend. Woodpeckers have been seen around **Discovery's** pad, outside the fence, but none to my knowledge on the vehicle itself. Certainly no more holes have been identified. Several bird deterrent mechanisms are currently in place on both pads. These include the plastic owl decoys, mylar strips, air horns, and water hoses. All but the mylar strips will be removed from pad A before **Atlantis** is launched this week. Additionally, three predator bird tapes have been acquired by the NASA Test Directors and will be played over the PA system at the pad if necessary. A test of the tapes was performed last night and apparently every bird within earshot flew away. It seems to work. The long term plan is to develop a wildlife habitat management plan. NASA is working on this with the U.S. Department of Agriculture. A final plan should be established in the next several weeks. [Buckingham, **Press Release**, June 21, 1995.]

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HELIUM LEAK INSPECTED

Managers have decided to further inspect a leaking reaction control system helium tank in the right-hand orbital maneuvering system pod on Shuttle **Atlantis**. The leak was determined to be sufficient enough to warrant further analysis. Technicians will gain access to the tank and the suspect fitting later this evening. Once the tank is depressurized, technicians will attempt to re-torque the fitting. If there is movement on the

fitting, the technician will torque the fitting to the specified value, the tank will be pressurized and another leak check performed. If the fitting is already tight, a decision will be made to remove and replace the entire helium tank. Managers believe both operations can be completed without impacting launch on Friday, given a success oriented operation without additional complications. [KSC Release, June 21, 1995.]

June 22:

LEAK REPAIRED; WEATHER REPORT

Procedures last night to repair the leaking helium tank on **Atlantis** were successful. All we had to do was de-pressurize the tank and replace a fitting on the tank. Another leak check was performed and all is good in the world. We are re-pressurizing the tank this morning to flight pressure and preparing for Friday afternoon. More details will be available later today about the fix. A Bermuda high will be east of Florida and upper flow will be from the southwest. An upper trough is still indicated in the southeast U.S. These conditions will bring the threat of afternoon and evening showers and thunderstorms associated with seabreeze fronts or upper level disturbances moving west to east across Florida. The probability of weather criteria violations is 80 %. There are concerns about crosswinds should a Return to Launch Site [RTLS] be necessary. [STS-71 Weather Outlook, June 22, 1995.]

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STS-71: PRELAUNCH UPDATE

The countdown for the launch of **Atlantis** on mission STS-71 on Friday at 5:08 p.m. EDT continues on schedule today. Overnight, technicians were able to repair a leaking helium tank in the reaction control system on **Atlantis'** right-hand orbital maneuvering system (OMB) pod. The pressure in the tank was reduced to ambient, a fitting on the tank replaced and a leak check performed. Results of the current leak checks are reported to be excellent. Once the tank is at full flight pressure later this morning, a final set of leak checks will be made and the OMB pod will be closed for flight. No other technical issues are being worked by the management team and no further problems are being reported from the pad. Yesterday operations to load the cryogenic reactants were completed at about 3 p.m. The orbiter's mid-body umbilical unit has been demated from the Orbiter and retracted into the fixed service structure. This was followed by final vehicle and facility closeouts. Today, the Orbiter's mid-deck storage facilities will be checked and final flight materials installed for the 11-day mission. Later today, preparations will begin to retract the rotating service structure (RSS) to launch position. RSS move is set for about 8:30 p.m. today. Loading of the external tank with cryogenic propellants is scheduled to begin at about 7:45 a.m. tomorrow. Air Force weather forecasters currently indicate an 80 percent probability of weather prohibiting launch on Friday. The primary concerns are for a likelihood of thunderstorms and showers in the vicinity of Launch Complex 39A. During Friday's launch window, the winds at Pad A are expected to be from the southeast at 12-18 knots; temperature 82 degrees F; visibility 7 miles; and clouds scattered at 3,000 feet, broken at 7,000 feet and 15,000 feet, and 80 percent cirrus coverage at 25,000 feet. The

24-hour and 48-hour forecasts reveal similar conditions and a 70 percent chance of violation each day. Today, the seven member astronaut crew will be briefed on tomorrow's launch weather outlook at Kennedy Space Center and the TAL sites in Spain and Africa. Also today, the crew will receive a final mission briefing and make last minute adjustments to their flight plans while completing their review of launch day activities. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 22, 1995.]

June 23:

STS-71 SCRUBBED DUE TO WEATHER

Mission Managers postponed today a scheduled launch of **Atlantis** due to the inability for tanking operations to commence. Operations to tank were put off from the original start time of about 7:45 a.m. due to severe weather and lightning within five miles of the launch pad, a stringent weather criteria which is in place for safety reasons. Managers delayed tanking as long as possible to still make a launch attempt today, but had to postpone launch when it became apparent the weather would not clear in time to tank and launch **Atlantis** during the short seven minute window. The decision to scrub was made at about 9:55 a.m. The specific weather rule states, tanking will not begin if lightning is observed within five nautical miles of the launch pad or is forecast to occur during the first hour of tanking. Tanking **Atlantis** involves loading about 500,000 gallons of super-cold liquid hydrogen and liquid oxygen into the large external tank of the Shuttle.

Atlantis has now been rescheduled for launch on Saturday, June 24 during a 10 minute window that opens at 4:43 p.m. The countdown clock has been recycled to the T-6 hour mark. Loading of the external tank with cryogenic propellants is scheduled to begin at about 7:30 a.m. tomorrow. A launch at 4:43 p.m. tomorrow would see **Atlantis** dock with the Russian Space Station on Monday and then land at KSC at about 12 noon on July 4. The seven-member crew of **Atlantis** will recycle to their launch-minus-one day schedule. They will be briefed on tomorrow's weather outlook at Kennedy Space Center and the TAL sites in Spain and Africa. Today, the crew will receive a final mission briefing and make last minute adjustments to their flight plans while completing their review of launch day activities. Air Force weather forecasters currently indicate a 70 percent probability of weather prohibiting launch on Saturday. The primary concerns are for a likelihood of thunderstorms and showers in the vicinity of launch Pad 39A. During Saturday launch window, the winds at Pad A are expected to be from the southeast at 8-12 knots; temperature 82 degrees F; visibility 7 miles; and clouds will be scattered at 3,000 feet and 6,000 feet, and broken at 12,000 feet and 25,000 feet. The 24-hour and 48-hour forecasts reveal similar conditions and a 70 percent chance of violation each day. The tanking forecast for tomorrow is listed as a 10 percent chance of violation, with the possibility of facing similar conditions as we had today. The STS-71 crew includes Commander **Robert L. Gibson**, Pilot **Charles J. Precourt**, Mission Specialists **Ellen S. Baker**, **Gregory B. Burch** and **Bonnie J. Dunbar**, Mir 19 Commander [Ascent only] **Anatoly Solovyev**, Mir 19 Flight Engineer [Ascent only] **Nikolai Budarin**, Mir 18

Commander [Entry only] **Vladimir Dezhurov**, Mir 18 Flight Engineer [Entry only] **Gennady Strekalov** and Mir 18 Cosmonaut-Researcher [Entry only] **Norman E. Thagard**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 23, 1995; STS-71 Status Report, June 23, 1995.]

June 24:

ANOTHER SCRUB FOR ATLANTIS

Poor weather at Kennedy Space Center forced Mission Managers to scrub today a launch attempt of **Atlantis**. Clouds, rain, thunderstorms and the threat of lightning postponed today a scheduled launch of **Atlantis** on the first mission to dock with Russia's Mir Space Station. No serious technical problems were encountered throughout the launch attempt today. However, as the astronauts and cosmonauts were about to leave for the pad, lightning struck the pad's lightning mast. No damage was incurred to the pad or vehicle and the count proceeded as planned. The decision to scrub was made at about 4:00 p.m. Launch of **Atlantis** has been re-scheduled for no earlier than Tuesday, June 27. The 10-minute window opens at about 3:32 p.m. EDT. An on-time launch Tuesday would result in a landing of **Atlantis** back at Kennedy Space Center on July 7 at about 10:54 a.m. The countdown clock in Firing Room 1 has been recycled to the T-11 hour mark. The rotating service structure will be moved back around the Orbiter tomorrow after de-tanking of the cryogenic fuels in the external tank are complete tonight. Following this, preparations will be made to top-off the onboard cryogenic tanks with liquid hydrogen and liquid oxygen reactants. The seven-member crew of **Atlantis** will remain at Kennedy Space Center during the stand-down time, awaiting Tuesday's launch attempt. There are few specific plans for crew activities Sunday and Monday. The commander and pilot are scheduled to fly the Shuttle Training Aircraft Monday evening beginning at 6:30 p.m. Other likely activities include vehicle and weather status briefings, flight plan review and relaxation time. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 24, 1995.]

June 25:

RAINY WEATHER TO CONTINUE

"I think Tuesday is going to be our best shot for a few days," said Capt. **David Biggar**, Shuttle forecaster with the Air Force's 45th Space Wing today. "There's going to be a lot of [thunderstorm] activity around, but with the window getting earlier and earlier each day, that might be favorable for us. We're just hoping the activity comes later in the afternoon, so we can get some kind of hole during the launch window," Biggar concluded. Attempts to launch **Atlantis** on its STS-71 mission were scrubbed both June 23 and June 24 due to rainy weather in the vicinity of the launch area both days. [Halvorson, **FLORIDA TODAY**, p. 1A, June 26, 1995.]

June 26:

SPACE ACT AGREEMENT SIGNED

A KSC-designed hydrogen flame detector that will help eliminate costly false alarms that are common with detectors now on the market will begin its final design and

development phase through a NASA Space Act technology transfer agreement signed last week between Kennedy Space Center and Scientific Instruments, Inc. [West Palm Beach, FL]. Under this agreement, Scientific Instruments will join KSC engineers in a two-year development and testing program to produce an electro-optical sensor system that will analyze both the ultraviolet (UV) and infrared (IR) wavelength emissions from hydrogen fires. A digital signal processor (DSP) in the unit will use an algorithm to distinguish between an invisible hydrogen flame and a flash of lightning or a bright reflection from a Space Shuttle launch pad hydrogen gas burnoff stack. This agreement, part of KSC's dual-use program, is the fourth of its type pioneered by the KSC Technology Programs and Commercialization Office. It was developed by the State of Florida's Technological Research and Development Authority (TRDA). The KSC office strives to identify developing technologies that both fulfill a need at the space center and have commercial applications. Once a technology has been identified, a commercial firm with expertise in an applicable industry and interest in pursuing final development of the product is selected as an industry partner. The multi-spectrum, hydrogen-specific detector represents the next step in flame detection systems. The false alarm problem led KSC engineers to initiate a research and design program that included development of a prototype that will be tested during the joint effort with Scientific Instruments. The new detector is the first of its type to use a DSP in its design. The algorithm, which contains a characterization of a hydrogen flame, was also developed at the space center. Liquid hydrogen is used as the fuel for the Shuttle Orbiter's three main engines and is loaded into the vehicle's external tank through an extensive storage and transfer system just hours before liftoff. Excess hydrogen is burned off through a stack during this operation. A leak and subsequent fire could threaten the safety of the Shuttle at the pad. The sensors we currently have at the launch pads can only detect ultraviolet emissions from a flame and consequently are prone to causing false alarms during thunderstorms and after a Shuttle liftoff, said KSC Lead Project Engineer **Gregory Hall**. When they work properly, they alert pad crews to invisible hydrogen fires that could damage the Space Shuttle. When they don't, they can cause delays in Shuttle processing time, since crews cannot enter the pad area when a warning for a hydrogen fire has been given. "We are a real commercial market for the UV-IR detector unit in the aerospace, petrochemical, medical and eventually the transportation fields, since hydrogen will be the fuel of the future for commercial operations," Scientific Instruments, Inc. President **Jack Hoey** said. "Because NASA has completed the initial design and development of the new detector, we will be able to save hundreds of thousands of dollars over what it would cost to produce this product on our own," he pointed out. "Once the UV-IR flame detector is on the market, KSC will be able to purchase off-the-shelf hardware at considerably less cost than if center engineers would have had to custom-build the detector units themselves," Hall said. The TRDA, which submitted the original proposal to KSC, has been designated by NASA to manage the UV-IR development project. The agency will also be involved in the prototype testing phase of the effort. [NASA/KSC Release No. 62-95, June 26, 1995.]

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COUNTDOWN CONTINUES TOWARD LAUNCH TOMORROW

The countdown for the launch of **Atlantis** on mission STS-71 on Tuesday at 3:32 p.m. EDT continues on schedule today. No serious technical issues are being worked by the management team and no problems are being reported from the pad. Workers are in the process of drying several thrusters that were exposed to rain water over the weekend. This is not an issue that is expected to hinder countdown or launch procedures. Operations are in work this morning to top-off the cryogenic reactants that service the Orbiter's fuel cells. The loading of these tanks on the Orbiter is expected to be complete by about 2 p.m. today. Once this is done, the Orbiter's mid-body umbilical unit will be demated from the Orbiter and retracted into the fixed service structure. Later today, preparations will begin to retract the rotating service structure (RSS) to launch position. RSS move is set for about 11:30 p.m. today. Loading of the external tank with cryogenic propellants is scheduled to begin at about 6:15 a.m. tomorrow. Air Force weather forecasters currently indicate a 70 percent probability of weather prohibiting launch on Tuesday. The primary concerns that have been persisting for the past several days are for a likelihood of thunderstorms and showers in the vicinity of Launch Pad 39A. During Tuesday's launch window, the winds at Pad A are expected to be from the east at 7-12 knots; temperatures 83 degrees F; visibility 7 miles; and clouds scattered at 3,000 feet and broken 25,000 feet. The 24-hour and 48-hour forecasts reveal similar conditions and a 70 percent chance of violation each day. The tanking forecast for Tuesday is listed as a 10 percent chance of violation. Today, the seven-member astronaut crew will be briefed on tomorrow's launch weather outlook at KSC and the TAL sites in Spain and Africa. Also today, the crew will receive a final mission briefing and make last minute adjustments to their flight plans while completing their review of launch day activities. The crew remained at KSC over the weekend. The commander and pilot are scheduled to fly in the Shuttle Training Aircraft late this afternoon. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, June 26, 1995; Halvorson, FLORIDA TODAY, p. 1A, June 27, 1995.]

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INTERIOR SECRETARY TO VISIT KSC

Interior Secretary **Bruce Babbitt** is scheduled to visit the Kennedy Space Center on Wednesday, June 28, as part of a three-day tour of Florida to focus attention on the environment and the upcoming re-authorization of the Endangered Species Act. Babbitt will observe three manatees in the KSC holding pen located on the NASA Causeway. Representatives from Sea World and the U.S. Fish and Wildlife Service will be conducting routine health checks on each of the manatees. Babbitt is expected to have hands-on contact with the manatees. The endangered mammals have been in the pens for about three weeks and will remain there for several more weeks until they are ready for release. [NASA/KSC Release No. 63-95, June 26, 1995.]

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SCHUMAKER, WHITESIDE APPOINTMENTS AT NASA

NASA Administrator **Daniel S. Goldin** has appointed **John D. Schumaker** as the Associate Administrator for the Office of External Relations and Dr. **Robert E. Whitehead** as the Associate Administrator for NASA's Office of Aeronautics, NASA Headquarters, Washington, D.C., effective immediately. Goldin said, "Bob Whitehead and John Schumaker are talented managers with extensive experience in their fields. Our aeronautics program and our work in developing partnerships with other nations are central elements of NASA's vision for the future, so we are indeed fortunate to have Bob and John heading up those key areas." [NASA/KSC News Release No. 95-102, June 26, 1995.]

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LOCKHEED CUTS TO SPARE KSC, FOR NOW

The consolidation brought on by the merger of Lockheed Space Operations Co. and Martin Marietta has resulted in the announcement today of some 12,000 job cuts over the next five (5) years; of these, 500 will come in Florida. "The bottom line is that we look at our employment numbers as being very steady here in Florida," said **Al Khami**, spokesman for the company's Orlando division. No job losses were mentioned for Lockheed Martin Space Operations at KSC where the company holds the Shuttle Processing Contract. Florida Today reported: "The company did report yesterday that it would consolidate some Shuttle operations now handled by subcontractors as of October. Lockheed said it would hire workers from those subcontractors." ["Lockheed's Cuts Spare Florida," FLORIDA TODAY, p. 10C, June 27, 1995; Reid, FLORIDA TODAY, pp. 1A-2A, June 27, 1995.]

June 27:

SUCCESSFUL STS-71 LAUNCH, FINALLY

The Space Shuttle **Atlantis** was successfully launched today on the 100th U.S. human space launch and the first mission to dock with Russia's Mir Space Station. Launch occurred exactly on time and without any serious technical concerns at 3:32.919 p.m. EDT. **Atlantis** is now scheduled to dock with Mir on Thursday (June 29) at about 9 a.m. Undocking from Mir will occur on July 4 and **Atlantis** will land back at Kennedy Space Center's Shuttle Landing Facility on July 7 at about 10:57 a.m. No problems are being reported from the pad following launch. Also, the booster recovery ships have reported sighting the boosters. They will approach and begin making preparations to secure the spent boosters. Towing operations back to Cape Canaveral begin tomorrow. "I'm not one to predict history," said Senior NASA Manager **Tommy Holloway**, Chief of the agency's Shuttle-Mir Docking Program. "But it is possible that our grandchildren will look back to this time and our work together and consider it a major milestone in the history not only of human spaceflight, but perhaps even the history of the world." Former cosmonaut **Valery Ryumin** said, "I believe it would be very difficult for each of the sides to continue separately. In this respect, integration is inevitable." The STS-71 crew includes Commander **Robert L. Gibson**, Pilot **Charles J. Precourt**, Mission Specialists

Ellen S. Baker, **Gregory J. Harbaugh**, and **Bonnie J. Dunbar**. Mir 19 Commander (MS4 Ascent only) **Anatoly Solovyev**, Mir 19 Flight Engineer (MS5 Ascent Only) **Nikolai Budarin**, Mir 18 Commander (Entry only) **Vladimir Dezhurov**, Mir 18 Flight Engineer (Entry only) **Gennady Strekalov** and Mir 18 Cosmonaut-Researcher **Norman E. Thagard**. [Halvorson, **FLORIDA TODAY**, p. 1A & 6A, June 28, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, June 27, 1995.]

June 28:

APOLLO PROGRAM GIVEN AEROSPACE PRIZE

The \$250,000 international Francois-Xavier Bagnoud Aerospace Prize, the world's largest award for aerospace achievement, will be given this year to the Apollo Space Program, both to honor its successful moon project and to re-ignite global interest in space exploration for the 21st Century. "We are awarding this prize to recognize the historic achievements of the Apollo Program, which allowed men to journey to a new world for the first time, as well as to establish a new challenge for the next century of space explorers," says **Thomas C. Adamson**, Chairman of the Prize Board. The 1995 prize will be divided into scholarships that will be awarded to aerospace students in master programs. The scholarship will be administered by the American Institute of Aeronautics and Astronautics. Sen. **John Glenn**, D-Ohio, the first American to orbit the Earth, will make the official announcement of the 1995 Award winner today at 9:30 a.m. EDT at the National Press Club [Zenger Room] in Washington, D.C. [**Aerospace Prize Selection Committee Press Release**, June 28, 1995.]

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SHUTTLE STATUS REPORTS

At Launch Complex 39B, technicians have completed **Discovery's** payload re-installation, the TDRS-G/IUS-26 interface verification test [IVT] and installation and calibration of the IUS Redundant Inertial Measurement Unit. Today, the pad techs are conducting a flight readiness test of the main engines and flight controls, a purge of the reaction control system thrusters and a TDRS-G launch/deployment simulation. They are also making Upper Stage battery connections. On June 29, aft main engine compartment closeouts are scheduled. Closing of the payload bay doors is targeted for July 10. Orbiter **Endeavour** [STS-69] was rolled to the Vehicle Assembly Building this morning. First motion from OPF Bay 1 was at 7:52 a.m. Arrival in the VAB transfer aisle occurred at 8:28 a.m. **Endeavour** will be mated to the external tank/solid rocket booster stack tonight. In the Vertical Processing Facility, the Wake Shield Facility was installed into the payload canister on Tuesday and will be transported to Pad 39A late Friday night. It will be installed into **Endeavour's** payload bay on July 10. **Columbia**, currently in OPF Bay 3, is undergoing a main propulsion system leak and functional test. Preparations are underway for installing auxiliary power unit No. 3 and for potable water servicing. Initial data from **Atlantis'** three main engines showed that they performed flawlessly on the June 27 launch of STS-71. The twin-solid rocket booster performance was also nominal. They were recovered by the solid rocket booster retrieval ships last night; towing to Port Canaveral began this morning. Arrival is anticipated at 6:00 a.m.

Thursday. The leak rate on *Atlantis*' fuel cell No. 1 oxygen liquid reactant quick disconnect has remained constant at 3/10 lb. per hour and is not a concern. [SPACE SHUTTLE STATUS REPORT, June 28, 1995.]

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NEW HEADQUARTERS OPERATIONS OFFICE

As part of an effort to dramatically reduce staffing at its headquarters, NASA is merging a variety of staff functions within an Office of Operations to be headed by **Michael D. "Chris" Christensen**, effective immediately. The new Headquarters Operations Office will consolidate institutional functions from seven organizations. Those functions, involving areas such as procurement and finance, relate to the daily running and operations of the NASA Headquarters installation. "This consolidation is one more step in a process that will result in a 50% reduction in staffing at NASA Headquarters by Fiscal Year 1999," said Acting Deputy Administrator **John R. Dailey**. "The new Operations Office under Chris Christensen will allow us to achieve the maximum amount of efficiency in the daily running of our organization here in Washington." Christensen began his NASA career as a Federal personnel intern in 1967. During his tenure at NASA, he has worked at the Kennedy Space Center, FL, Johnson Space Center [Houston, TX] and the Goddard Space Flight Center [Greenbelt, MD], as well as NASA Headquarters. In 1975, he became Deputy Chief of the Manpower Utilization Division at Goddard. In 1979, Christensen rejoined NASA in his current capacity as Deputy Associate Administrator for Management Systems and Facilities. He has been the recipient of the Secretary of Agriculture's Distinguished Service Award, NASA's Exceptional Service Award, and a Presidential Meritorious Rank Award. He and his wife, Jan, reside in **Columbia, MD**. [NASA/KSC Release No. 95-105, June 28, 1995.]

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NASA WINS IMPORTANT HOUSE VOTE

The House Science Committee approved legislation today that would provide long-term and stable funding for NASA's proposed International Space Station. The committee voted to spend \$13.1 billion over seven years - not to exceed \$2.1 billion in any one year - to pay for remaining development, assembly and early operations of the Station. Rep. **Dave Weldon** (R-Palm Bay, FL) said that the vote represented a "clear signal" of Congressional support for the Station. "Obviously," he said, "the Station is an important program that adds to the nation's economic stability." [Knott, **FLORIDA TODAY**, p. 2A, June 29, 1995.]

June 29:

STS-71: DOCKING SUCCESSFUL & RIGHT ON TIME

The Space Shuttle *Atlantis* successfully docked with Russia's Mir Space Station today at 9:00 a.m. Undocking will occur on July 4 and *Atlantis* will land at Kennedy Space Center on July 7. The booster recovery ships - Freedom Star and Liberty Star - have returned to Port Canaveral with the mission's solid rocket boosters in tow and will be arriving at Hangar AF this afternoon. The STS-71 crew includes: Commander **Robert**

L. Gibson, Pilot **Charles J. Precourt**, Mission Specialists **Ellen S. Baker**, **Gregory J. Harbaugh** and **Bonnie J. Dunbar**, Mir 19 Commander **Anatoly Solovyev**, Mir 19 Flight Engineer **Nikolai Budarin**, Mir 18 Commander **Vladimir Dezhurov**, Mir 18 Flight Engineer **Gennady Strekalov**, and Mir 18 Cosmonaut-Researcher **Norman E. Thagard**. Gibson indicated Wednesday that he was aware of the historic nature of his mission, saying: "We are continuing in some footsteps that were laid down a long, long time ago. We're very pleased that it is all coming together." [Banke, **FLORIDA TODAY**, p. 1A, June 29, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, June 29, 1995; Banke, **FLORIDA TODAY**, p. 2A, June 29, 1995; "Steps to Mir," **FLORIDA TODAY**, p. 2A, June 29, 1995.]

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SHUTTLE PROCESSING UPDATES

Discovery, now at Launch Complex 39B, has completed its main engine flight readiness test; today, pad technicians are conducting aft engine compartment closeouts. STS-70 work scheduled: ordnance and hypergolic pressurization operations; closing of payload bay doors for flight; countdown set to begin July 10; crew arrival for launch, also on July 10. **Endeavour** is now in the VAB being readied for rollout to Launch Complex 39A for its STS-69 mission. The Orbiter has been mated with its mission external tank; hard mate occurred at about 6:00 a.m. today. **Columbia's** payload premate test in process today in OPF Bay 3. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, June 29, 1995.]

June 30:

UPCOMING MISSIONS

While the STS-71 docking mission continues to proceed smoothly, technicians at Kennedy Space Center are engaged in readying **Discovery** for its July 13 STS-70 mission. **Discovery** is hard-down at Launch Complex 39B where the STS-70 main engine flight readiness test has been completed. Today, aft engine compartment closeouts will be undertaken. STS-70 work scheduled: ordnance and hypergolic pressurization operations [July 6]; closing payload bay doors for flight [July 10]; Countdown beginning and crew arrival [July 10]. **Endeavour** is in Vehicle Assembly Building Bay 1 where it has been mated with its STS-69 external tank and the Shuttle interface test has been scheduled to begin July 1. Rollout to Launch Complex 39A is set for the evening of July 5. **Columbia** [OV-102] remains in OPF Bay 3 where its STS-73 Orbiter/payload premate test is currently in process. The mission drag chute was installed yesterday. **Columbia's** prime cargo will be the U.S. Microgravity Laboratory-2. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, June 30, 1995.]

JULY

July 3:

STS-70 PROCESSING UPDATE

While **Discovery** is at Launch Complex 39B, technicians are busy with a number of pre-launch processing activities. The TDRS-G/IUS-26 astronaut sharp edge inspection and IUS flight readiness checks have been completed. Aft main engine closeouts are underway today. STS-70 work scheduled: final ordnance work and hypergolic tank pressurization; stowage of flight crew equipment; countdown preparations in Firing Room 3; TDRS battery charging; external tank closeouts; solid rocket booster closeouts; installation of aft main engine compartment flight doors; beginning of payload closeouts; commencement of countdown; closing of payload bay doors and crew arrival on July 10. The Shuttle interface test to verify the electrical and mechanical connections between the Orbiter, external tank and solid rocket boosters is underway and will conclude on Wednesday. Rollout to Launch Complex 39A of **Endeavour** for its STS-69 mission is set for 12:01 a.m. July 6. On Friday [June 30], the Wake Shield Facility began its trip from the Vertical Processing Facility to the launch pad. It was installed into the payload changeout room at the pad on Saturday morning. Installation into **Endeavour's** payload bay is scheduled for July 12. The main propulsion system leak and functional testing of **Columbia** is continuing. Closeouts of the extended duration Orbiter [EDO] pallet are also underway. Landing of **Atlantis** at the conclusion of its STS-71 mission is targeted for 10:54 a.m. on July 7, weather permitting. A second opportunity is available at 12:30 p.m. Should landing be rescheduled by 24 hours the KSC landing times are 11:35 a.m. and 1:12 p.m. [KSC SPACE SHUTTLE STATUS REPORT, July 3, 1995.]

July 5:

PRE-LAUNCH UPDATES

While **Atlantis'** STS-71 mission remains on orbit, Kennedy Space Center technicians at LC 39B are preparing for next week's launch of STS-70. **Discovery's** airlock has been closed out and, today, technicians are working on aft engine compartment closeouts, purging the mission's external tank and implementing other launch countdown preparations. Ordnance and hypergolic pressurization operations will be conducted tomorrow. Launch countdown begins July 10 at 10:00 a.m.; the crew arrives that afternoon. Meanwhile, **Endeavour** is in the Vehicle Assembly Building where it is being prepared for its STS-69 mission to deliver to orbit and deploy the Wake Shield Facility-2 and Spartan 201-203. Rollout to Launch Complex 39A is planned for tonight. A hot firing of APUs 2 and 3 is set for tomorrow. Payloads will be installed July 12 and the mission's terminal countdown demonstration test is planned for July 19-20. In Orbiter Processing Facility Bay 3, the eldest Space Shuttle - **Columbia** - is being readied for its next mission, STS-73. In the OPF bay, the Orbiter/payload premate test is complete and preparations are presently underway to install the vehicle's U.S.M.L.-2 payload next week. In addition, the right-hand orbital maneuvering system pod will be installed on

the Orbiter next week. The STS-73 mission is planned for September 21 at 10:37 a.m.; the launch window for the mission is planned for 2 1/2 hours; mission duration will be 16 days. [KSC SPACE SHUTTLE STATUS REPORT, July 3, 1995.]

July 6:

DISCOVERY HARD DOWN AT LC-39B

Rollout of **Endeavour** to Launch Complex 39B occurred late last night with first motion out of the Vehicle Assembly Building at about 11 p.m.. The vehicle was hard-down on the pad at about 4:30 a.m. today. Hot firing of APUs 2 and 3 will occur tonight. The rotating service structure will be moved around the vehicle about 8:00 a.m. tomorrow. Also, Managers yesterday decided to move **Endeavour's** target launch date to no earlier than August 3. The Wake Shield Facility-2 and Spartan 201-203 will be installed in **Endeavour** on July 12; the mission's flight readiness review comes July 18 and STS-69's TCDT occurs July 19-20. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 6, 1995.]

July 7:

ATLANTIS LANDS ON TIME AT KSC

The Space Shuttle **Atlantis** ended its historic STS-71 mission with a landing at KSC at 10:54 a.m. EDT. Landing came on the Shuttle Landing Facility's runway 15 at the conclusion of orbit 154. The crew for the mission included: Commander **Robert L. Gibson**, Pilot **Charles J. Precourt**, Mission Specialists: **Ellen S. Baker**, **Gregory B. Boush** and **Bonnie J. Dunbar**, Mir 19 Commander: **Anatoly Solovyev**, Mir 19 Flight Engineer **Nikolai Budarin**, Mir 18 Commander **Vladimir Dezhurov**, Mir 18 Flight Engineer **Gennady Strekalov** and Mir 18 Cosmonaut-Researcher **Norman E. Thagard**. The STS-71 mission's duration was 9 days, 19 hours and 23 minutes. [NASA/KSC News Release No: 65-95, July 6, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 7, 1995.]

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NEXT MISSION: STS-70

The countdown for launch of the Space Shuttle **Discovery** on mission STS-70 is scheduled to begin Monday, July 10, at 10:00 a.m. EDT, at the T-43 hour mark. The KSC launch team will conduct the countdown from Firing Room 3 of the Launch Control Center. The countdown includes 28 hours and 41 minutes of built-in hold time leading to the opening of the launch window at 9:41 a.m. EDT on July 13. The launch window extends for 2 1/2 hours. STS-70 is the fourth mission scheduled for 1995. This will be the 21st flight of the Shuttle **Discovery** and the 70th flight overall in NASA's Space Shuttle Program. The primary purpose of STS-70 is to deploy the Tracking and Data Relay Satellite (TDRS-G), the last in a series of a space-based satellite network that provides communications, tracking, telemetry, data acquisition and command services essential to Shuttle and low-Earth orbital spacecraft missions. Also, STS-70 marks the first flight of the new Block 1 Space Shuttle main engine, located in the No. 1 position on **Discovery** which was rolled out of Orbiter Processing Facility Bay 2 on May 3 and

mated with the external tank and solid rocket boosters in the Vehicle Assembly Building. The Shuttle stack was transported to Launch Complex 39B on May 11. **Discovery** had to be returned to the VAB on June 8 to allow access to the external tank for repairs of nearly 200 holes in the foam insulation caused by nesting woodpeckers. The holes were patched and **Discovery** was returned to LC 39B on June 15. **Discovery** last flew in February of 1995. The STS-70 crew members are: Commander **Terence T. Henricks**, Pilot **Kevin R. Kregel**, and Mission Specialists: **Nancy Jane [Sherlock] Currie**, **Donald A. Thomas**, and **Mary Ellen Weber**. The five-member astronaut crew was scheduled to arrive at Kennedy Space Center's Shuttle Landing Facility late last night but were diverted to Orlando International Airport at about 6:30 p.m. due to heavy rains and lightning at KSC. The crew was driven from Orlando to their KSC crew quarters, arriving about 8:00 p.m. yesterday. Today they will be involved with checking out their mission plans and fit checks of their equipment. **Endeavour's** STS-69 mission is targeted for August 3 at approximately 10:40 a.m.; the launch window for the mission, like that of STS-70, is 2 1/2 hours. The mission of **Endeavour** is to deliver and deploy the Wake Shield Facility-2 and Spartan 201-203. The mission's payload will be installed in the Orbiter on July 12, followed on the 18th by the flight readiness review and the terminal countdown demonstration test on July 20-21. **Endeavour's** crew includes: Commander **David M. Walker**, Pilot **Kenneth D. Cockrell**, Payload Commander/Mission Specialist **James S. Voss** and Mission Specialists **James H. Newman** and **Michael L. Gernhardt**. On September 21, **Columbia** will launch at 10:37 a.m. for a 16 day flight during which the five-member crew will deploy and operate the U.S. Microgravity Laboratory-2. Preparations are underway to install the USML-2 early next week. Also, the right-hand orbital maneuvering system pod will be installed on the vehicle by mid-week. The 72nd Space Shuttle crew includes: Commander **Kenneth D. Bowersox**, Pilot **Kent V. Rominger**, Payload Commander **Kathryn C. Thornton**, Mission Specialists: **Catherine G. Coleman** and **Michael E. Lopez-Alegria** and Payload Specialists: **Fred Leslie** and **Albert Sacco**. [NASA/KSC News Release No: 66-95, July 7, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 7, 1995; Buckingham, July 10, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 11, 1995; Banke, FLORIDA TODAY, p. 1A-2A, July 11, 1995; Banke, FLORIDA TODAY, p. 2A, July 12, 1995.]

July 9:

VAB'S DESIGNER DEAD AT 83

Max O. Urbahn, the leading designer of the Vehicle Assembly Building at Kennedy Space Center died today at his home in Stonington, CT; he was 83. Urbahn was a nationally known architect and had formerly been President of the American Institute of Architects [1972]. He headed the design and construction of the VAB and was also a leading designer of the Fermi National Accelerator Laboratory Complex at Batavia, IL. Last year he was awarded a gold medal from the Society of Military Engineers. Urbahn was born in Burscheid, Germany, on February 2, 1912; he studied architecture at the University of Illinois and Yale University. The Vehicle Assembly Building rises roughly as high as a 50-story building and is nearly as wide across as it is tall. The VAB

contains 125 million cubic feet of space, a volume large enough to enclose the Great Pyramid of Cheops in Egypt. During its construction, Urbahn was interviewed by THE NEW YORK TIMES, telling that paper that the building was "little more than a slick, polished box." In that interview, he also spoke about the "engineering and administrative challenges involved in creating a building that covered eight acres and required doors more than 400 feet high." Urbahn led four firms in designing the VAB and the Launch Control Center, a project taking more than four years to complete. ["Launch Building Designer Dies," FLORIDA TODAY, p. 3A, July 13, 1995; "Max O. Urbahn Is Dead at 83; Designed Vast NASA Building," THE NEW YORK TIMES, p. A13, July 13, 1995.]

July 10:

STS-70: COUNTDOWN BEGINS

The countdown for launch of STS-70 began at 10:00 a.m. today for a 2 1/2 hour launch window opening at 9:41 a.m. on Thursday, July 13. TDRS deployment is scheduled to occur at about 3:53 p.m. on launch day. **Discovery** is scheduled to land at KSC's Shuttle Landing Facility at 7:51 a.m. July 21. Aft engine compartment closeouts have been completed along with TDRS payload closeouts. Today, workers begin final vehicle and facility closeouts for launch and start preparations for servicing fuel cell storage tanks. They also begin the stowage of flight crew equipment in anticipation of the crew's arrival at 4:20 p.m. today. The payload bay doors will be closed at 7:00 p.m. today. The five-hour cryogenic reactant loading operation into **Discovery's** fuel cell storage tanks is set to begin at 8:00 a.m. July 11. The rotating service structure will be moved to launch position at about 5:30 p.m. on July 12 and external tank loading operations commence at 1:21 a.m. on July 13, launch day. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, July 10, 1995.]

July 11:

LAUNCH COUNTDOWN UPDATE

The countdown for launch of **Discovery** began at 10:00 a.m. yesterday for a 2 1/2 hour launch window opening at 9:41 a.m. on Thursday, July 13, 1995. TDRS deployment is scheduled to occur at about 3:53 p.m. Thursday. **Discovery** is scheduled to land at KSC's Shuttle Landing Facility at 7:51 a.m. July 21. At this time, LC 39B has been cleared for loading the onboard cryogenic tanks with the liquid hydrogen and liquid oxygen reactants. Reactant loading is expected to be finished at about 1:00 p.m. The reactants will provide electricity water as a by-product during their 8-day mission. After the cryogenics are loaded, the Orbiter's mid-body umbilical unit will be demated and retracted into the fixed service structure. Final vehicle and facility closeouts will also resume. Final mid-deck payload loading operations will finish tomorrow. On Wednesday, preparations will be made to retract the rotating service structure to launch position at about 5:30 p.. Loading of the external tank with cryogenic propellants is scheduled to begin at about 1:21 a.m. Thursday. Air Force weather forecasters are currently indicating a 40 percent probability of weather prohibiting launch on Thursday. The primary concerns are for thick layered clouds associated with showers and thunderstorms. During Thursday's launch window, the winds at Pad B are expected to

be from the east at 7-12 knots; temperature 83 degrees F; visibility 7 miles; humidity 72 percent; and clouds scattered at about 3,000 and 10,000 feet, and broken at 30,000 feet. The 24-hour-delay forecast reveals similar conditions and a 40 percent chance of violation. The STS-70 crew includes: Commander **Terence T. Henricks**, Pilot **Kevin R. Kregel** and Mission Specialists: **Nancy Jane [Sherlock] Currie**, **Donald A. Thomas** and **Mary Ellen Weber**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 11, 1995; Leary, THE NEW YORK TIMES, p. A11, July 13, 1995.]

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STS 70: CREW ARRIVES...IN ORLANDO

Bad weather in central Florida forced the crew of STS-70 to land at Orlando International Airport instead of Kennedy Space Center; they rode to KSC in a rented van. When they walked into an airport lounge they were greeted by well-wishers and autograph seekers. Launch rules state that the crew is not to be "within 25 feet of anyone not approved by NASA doctors. The quarantine of Shuttle crews begins a week before launch and is instituted to prevent any chance of the astronauts catching a cold at the last minute, according to **Kari Fluegel**, a KSC spokesman. She said that the incident "is nothing the flight surgeons are concerned about." By the way, the astronauts were not charged for the ride to the space center. **Pam Lowe**, an American manager at the airport said she drove the van out to the runway apron, left the keys in the ignition and waved goodbye. [Banke, FLORIDA TODAY, July 12, 1995.]

July 12:

COUNTDOWN SMOOTH TO-DATE

The countdown for the launch of **Discovery** on Mission STS-70 remains on schedule to occur at the opening of a 2 1/2 hour launch window at 9:41 a.m. on Thursday, July 13. The principle payload, TDRS-G, a tracking and data relay satellite, will be deployed from the Orbiter's payload bay at about 3:53 p.m. Thursday. **Discovery** is scheduled to land at KSC's Shuttle Landing Facility at 7:51 a.m. July 21. No serious technical issues are being worked by the Shuttle Management Team and no problems are being reported from the pad. Workers are in the process of activating the Orbiter's inertial measurement units and making preparations to retract the rotating service structure from the vehicle as early as 5:30 p.m. today. This move could be delayed by several hours without impacting the overall schedule if weather threatens the area this afternoon. Loading of the external tank with cryogenic propellants is scheduled to begin at about 1:21 a.m. tomorrow. **Robert B. Sieck**, Director of Shuttle Management and Operations, said today, "Again, we'll be looking to Mother Nature. She may be a factor in how successful we are." NASA's Associate Administrator for Communications, **Charles Force**, joked that **Discovery** has been renamed and is now known as the "yellow shafted flicker." Air Force weather forecasters currently indicate a 40 percent probability of weather prohibiting launch on Thursday. The primary concerns are for clouds associated with showers and thunderstorms and a chance of crosswind violations at the Shuttle Landing Facility. During Thursday's launch window, the winds at Pad B are expected to be from the east at 10-15 knots; temperature 82 degrees F; visibility 7 miles; humidity

77 percent; and clouds scattered at 3,000 and 10,000 feet, and broken at 30,000 feet. The 24-hour delay forecast reveals similar conditions and a 40 percent chance of violation. Today, the five-member crew will be briefed on tomorrow's launch weather outlook at KSC and the TAL sites in Spain and Africa. Also today, the crew will receive a final mission briefing and make last minute adjustments to their flight plans while completing their review of launch day activities. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 12, 1995; Banke, FLORIDA TODAY, p. 1A, July 13, 1995; Borenstein, THE ORLANDO SENTINEL, July 13, 1995; Leary, THE NEW YORK TIMES, p. A11, July 13, 1995.]

July 13:

STS-70: UP AND OUTTA HERE!

The countdown for the launch of **Discovery** on Mission STS-70 went without serious problem today and **Discovery** was successfully launched at 9:41.55 a.m. The principle payload, TDRS -- a tracking and data relay satellite will be deployed from the Orbiter's payload bay at about 3:54 p.m. EDT today. **Discovery** is scheduled to land at KSC's Shuttle Landing Facility at 7:52 a.m. July 21. No serious technical issues were worked by the Shuttle Mission Management Team during the final hours of the countdown. However, the count was held for 55 seconds at the T-31 second mark as engineers worked to verify that the signal from the range safety system was operating properly and capable of being received by the destruct device on the external tank. The halt in the countdown was called for by Lockheed-Martin engineer **Todd Gracom** who "noticed that a radio link that is part of the Shuttle's safety system didn't look right on his computer console." Gracom performed an emergency test of the system, found no actual problem and the countdown continued successfully. Launch Director **Jim Harrington** and other NASA managers praised Gracom and Harrington said, "That young man did an outstanding job." The new Block 1 main engine also performed well. "The quick-look data from the engine folks says that thing performed right down the middle of all the parameters," said former astronaut **Loren Shriver**, now NASA's Launch Integration Manager at KSC. The crew of STS-70 has five members: Commander **Terence T. Henricks**, Pilot **Kevin R. Kregel**, Mission Specialists: **Donald A. Thomas**, **Nancy Jane Cunniff** and **Mary Ellen Weber**. [Banke, FLORIDA TODAY, pp. 1A & 8A, July 14, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 13, 1995; Banke, FLORIDA TODAY, July 13, 1995]

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MANAGEMENT CHANGES AT KSC

On July 10, Kennedy Space Center Director **Jay F. Honeycutt** announced: "effective immediately, Mr. **Francis X. Durso** is designated Director, Facilities Engineering and Project Management in the Engineering Development Directorate. Frank comes to the Kennedy Space Center from his position as Chief of the Facilities Planning and Projects Office at NASA Headquarters, where he was responsible for managing all NASA Construction of Facilities projects. He joined NASA in 1963 as a facilities engineer for the Lewis Research Center....On July 13, Honeycutt also announced that "effective

immediately, Mr. **Joel Reynolds** is designated Acting Director of Safety and Reliability in the Safety and Mission Assurance Directorate. Joel previously served as Deputy Director of Safety and Reliability." [KSC/NASA Announcement, July 10, 1995; KSC/NASA Announcement, July 13, 1995; Wheeler & Halvorson, **FLORIDA TODAY**, Oct. 12, 1995.]

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STS-69: PROCESSING PROGRESS

The Wake Shield Facility-2 and Spartan 201-203 have been installed in the cargo bay of **Endeavour** which is being readied now for its STS-69 launch in August. Workers at Launch Complex 39A are making plans for the mission's helium signature test which is planned for implementation on July 14. Crew arrival for the terminal countdown demonstration test is slated for 4:30 p.m. on July 17; the flight readiness review is set for Jul 18. **Columbia's** next mission is STS-73 and will feature the deployment and operation of the U.S. Microgravity Laboratory-2. Key operational milestones for STS-73 include: installation of main engines (July 15-16); installation of the right hand orbital maneuvering system pod (July 15); installation of the auxiliary power units (July 22) and the crew equipment interface test (July 29). **Atlantis** will follow up its historic STS-71 mission with the second Mir Docking on STS-74; launch is currently planned to occur October 26 at 10:49 a.m. Post-STS-71 activities are currently underway. By July 18, workers are expected to have completed the off-load of residual hypergolic reactants and the vehicle's main engines (July 24-25). [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 13, 1995.]

July 14:

TDRS LAUNCHED SUCCESSFULLY

Following yesterday's launch of **Discovery's** STS-70 mission, the TDRS payload was successfully deployed. The Inertial Upper Stage fired its motors twice and placed the Tracking and Data Relay Satellite [TDRS] into its proper geostationary orbit, 22,000 miles above the Pacific Ocean. **Discovery** is scheduled to land at Kennedy Space Center's Shuttle Landing Facility at 7:52 a.m. July 21. The STS-70 solid rocket boosters were delivered to Hangar AF this morning; disassembly will begin July 17. The crew for STS-70 includes: Commander **Terence T. Henricks**, Pilot **Kevin R. Kregel** and Mission Specialists: **Donald A. Thomas**, **Nancy Jane [Sherlock] Currie**, and **Mary Ellen Weber**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 14, 1995.]

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UPCOMING MISSIONS

At Launch Complex 39A, the Space Shuttle **Endeavour** is being readied for its August 3 liftoff on STS-69. The primary payloads for the mission are the Wake Shield Facility-2 and Spartan 201-203. Today, pad workers are conducting the mission's helium signature test. Operational Milestones include: loading of hypergolic reactants on July 17; crew arrival for the terminal countdown demonstration test, also on July 17; the

flight readiness review on July 18 and the TCDT on July 19-20. The crew for STS-69: Commander **David M. Walker**, Pilot **Kenneth D. Cockrell**, Payload Commander/Mission Specialist **James S. Voss** and Mission Specialists: **James H. Newman** and **Michael L. Gernhardt**. **Columbia** and **Atlantis** are being readied for their next missions in the Orbiter Processing Facility. **Columbia**, in OPF Bay 3, is being prepared for STS-73; today technicians will install the mission main engines, conduct a payload interface verification test and install and check the tunnel adapter for leaks. Upcoming processing milestones: installation of the right-hand orbital maneuvering system pod on July 15-16, installation of the auxiliary power units (APUs) on July 22 and the crew equipment interface test on July 29. Meanwhile, **Atlantis** resides in OPF Bay 2 where the orbiter docking device was removed from the payload bay and moved to the Vehicle Assembly Building last night. The spacelab will be removed tomorrow (July 19). Preparations are in work today to remove the main engines the week after next. Processing milestones include the complete off-load of residual hypergolic reactants today and removal of the main engines on July 24-25. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 14, 1995.]

July 17:

CHANTAL NO LONGER A LANDING THREAT

Tropical Storm Chantal has veered north and is not expected to threaten Florida or impact **Discovery's** plans to land at Kennedy Space Center's Shuttle Landing Facility at 7:52 a.m. Friday (July 21). The STS-70 solid rocket boosters are at Hangar AF where disassembly and post-flight inspections are underway. **Endeavour**, meanwhile, is positioned at Launch Complex 39A where it awaits launch on the STS-69 mission. Today workers are loading hypergolic reactants and preparing for the mission's terminal countdown demonstration test (TCDT) on July 24. In OPF Bay 3, technicians have completed **Columbia's** payload interface verification test. They have also installed and leak-checked the tunnel adapter, installed the mission main engines and the right-hand orbital maneuvering system pod. The prime cargo for STS-73 is the U.S. Microgravity Laboratory-2. Today, technicians in OPF Bay 3 are conducting **Columbia's** payload end-to-end test. Finally, **Atlantis** which recently returned from its historic Mir Docking Mission - STS-71 - is being prepared for its second docking mission - STS-74. The spacelab module has been removed from **Atlantis'** cargo bay and preparations are in work to remove the vehicle's main engines next week. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 17, 1995.]

July 18:

STS-69: WSF-2 & SPARTAN 201-203

While **Discovery** remains in orbit on its STS-70 mission, technicians on the ground are preparing **Endeavour** for its August STS-69 mission. The crew arrived at Kennedy Space Center for the mission's terminal countdown demonstration test; the crew includes: Commander **David M. Walker**, Pilot **Kenneth D. Cockrell**, Payload Commander/Mission Specialist **James S. Voss** and Mission Specialists **James H. Newman** and **Michael L. Gernhardt**. Today, LC 39A technicians are readying for STS-69's flight readiness review

and loading hypergolic reactants. The TCDT is set to occur July 19-20 with a Wake Shield Facility-2 interface verification test planned for July 21. Orbiter aft engine compartment closeouts commence July 24 and the countdown is planned for a July 31 start. In OPF Bay 3, **Columbia** is being prepped for its STS-73 mission on which the U.S. Microgravity Laboratory-2 will be deployed and utilized. The vehicle's right-hand orbital maneuvering system pod has been installed along with the main engines and the tunnel adapter which has been checked for leaks. Today, OPF techs will conduct a payload end-to-end test and are securing the vehicle's main engines. A crew equipment interface test is targeted for July 29; the payload bay doors will be closed August 7 and the vehicle will be rolled over to the Vehicle Assembly Building on August 16 where it will be mated with its solid rocket boosters and external tank. Finally, **Atlantis** is being prepped today for the removal of its main engines next week. The vehicle is located in OPF Bay 2. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 18, 1995.]

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STS-69 SET TO LAUNCH AUGUST 5

NASA Managers have selected August 5 as the official launch date for the next Space Shuttle mission, STS-69, pending resolution of open items including the post flight assessment of an anomaly on one of the STS-71 solid rocket booster nozzle joints. The 11-day mission will feature the second flight of the Wake Shield Facility (WSF), a saucer-shaped satellite that will fly free of the Shuttle for several days. The WSF will grow thin films in a near perfect vacuum created by the wake of the satellite as it moves through space. The crew will also deploy and retrieve the Spartan 201 astronomy satellite, perform a six-hour spacewalk to test assembly techniques for the International Space Station and test thermal improvements made to space suits used during spacewalks. The commander for the mission is three-time Shuttle veteran **David M. Walker** and the pilot is **Kenneth D. Cockrell**, making his second flight. The three mission specialists are **James S. Voss**, flying for the third time, **James H. Newman**, making his second flight, and **Michael L. Gernhardt**, making his first flight. The Shuttle **Endeavour** is set to liftoff from Launch Complex 39A at 10:45 a.m. EDT at the opening of a 2 1/2 hour launch window. Landing is planned for August 16 at the Kennedy Space Center. [NASA/KSC News Release No. N95-49, July 18, 1995.]

July 20:

STS-70: LANDING WEATHER LOOKS GOOD

High pressure will begin building into southeast Florida on Friday and will cover most of the state by Saturday. On Friday conditions are generally favorable with a possibility of early morning low clouds and a chance of ground fog on the first landing opportunity at 7:54 a.m. Should this occur, improvement is predicted for the second landing opportunity at 9:30 a.m. Weather conditions are favorable for landing on Saturday if necessary. Edwards Air Force Base also indicates acceptable conditions on Friday and Saturday. [STS-70 LANDING WEATHER FORECAST, July 21, 1995.]

STS-69: PRE-LAUNCH UPDATE

Following yesterday's Flight Readiness Review, STS-69 Mission Managers selected August 5 as the official launch date for **Endeavour's** next mission. Also, a quick disconnect on **Endeavour's** right-hand orbital maneuvering system pod oxidizer tank leaked during hypergolic reactant loading and will have to be replaced next week. The tank will be drained to perform this work. No impact to the overall schedule is anticipated. The mission's terminal countdown demonstration test is set to begin at approximately 11:00 a.m. today. Tomorrow a Wake Shield Facility interface verification test is planned. On Monday, July 24, Launch Complex 39A technicians will begin aft engine compartment closeouts; STS-69 countdown commences on August 2. In addition to the Wake Shield Facility-2, the STS-69 crew will deploy the Spartan 201-203 experiments. Meanwhile in OPF Bay 3, workers are preparing **Columbia** for its STS-73 mission currently targeted for launch on September 21. A payload end-to-end test of the primary cargo - U.S. Microgravity Laboratory-2 - has been completed; Spacelab horizontal stowage is also finished. Today, technicians are securing the vehicle's main engines and are conducting a pressure check of the tunnel adapter. A crew equipment interface test will be made on July 29, followed by closing the payload bay doors on August 7 and rollover to the Vehicle Assembly Building on August 18. In OPF Bay 2 where **Atlantis** is parked, work to complete the off-load of residual hypergolic reactants from the vehicle will conclude tonight. Preparations are in work to remove the main engines next week. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 19, 1995.]

July 20:

STS-70: LANDING AT 7:54 A.M.

Discovery is scheduled to land at Kennedy Space Center's Shuttle Landing Facility tomorrow morning at 7:54 a.m. A second landing opportunity is available at about 9:30 a.m. Weather forecasters indicate generally favorable conditions for landing with a slight chance of low clouds and ground fog during the early morning hours. The landing of **Discovery** will mark the 24th landing at KSC in the history of Space Shuttle flight. It will be the third KSC landing this year. STS-70 crewmembers include: Commander **Terence T. Henricks**, Pilot **Kevin R. Kregel** and Mission Specialists: **Donald A. Thomas**, **Nancy Jane [Sherlock] Currie**, and **Mary Ellen Weber**. At Launch Complex 39A, the terminal countdown demonstration test for STS-69 starts today at 11 a.m. In OPF Bay 3, **Columbia's** main engines have been secured and the tunnel adapter has been pressure checked. The Spacelab transfer tunnel will be installed on July 24, preparations for its installation commence today. Technicians are also working to repair the attach point on the right-hand orbital maneuvering system pod. Nearby, in OPF Bay 2, work to complete the off-load of residual hypergolic reactants from **Atlantis** continues today. Next week Orbiter windows 5 and 6 will be replaced and the landing gear and tires will be removed. Also, preparations are in work to remove the main engines July 24 and 25. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 20, 1995; NASA/KSC Release No. 71-95, July 20, 1995.]

CLIPPER TO BE PART OF RLV PROGRAM

The U.S. Air Force has transferred to NASA's Office of Space Access and Technology the un-piloted, single-stage rocket known as the Delta Clipper-Experimental [DC-X] for use in NASA's Reusable Launch Vehicle [RLV] technology program. The transfer was made after the successful completion of a series of test flights conducted for the Air Force by McDonnell Douglas at the U.S. Army's White Sands Missile Range in New Mexico. The rocket, renamed the Delta Clipper-Experimental Advanced [DC-XA] by NASA, now will be modified with technology intended for use in the X-33 or X-34 reusable launch vehicles now under development by NASA and its aerospace industry partners. The DC-XA then will undergo extensive ground and flight testing that will provide valuable information to the X-33 and X-34 programs. Flight testing could begin as early as April 1996 at White Sands. "We plan to take these new technology components and test them in a real world environment," said NASA's DC-XA Project Manager **Dan Dumbacher** of Marshall Space Flight Center [Huntsville, AL]. Marshall is the host center for NASA's RLV Technology Program. "We will demonstrate what it takes to support and operate this single-stage rocket and show its performance in the real world. What we learn by testing the DC-XA will enable us to reduce hardware design changes downstream in the X-33 and X-34 programs. This will save these programs both time and money." McDonnell Douglas will make the enhancements to the DC-XA in Huntington Beach [CA]. Changes include the addition of an aluminum-lithium liquid oxygen tank; a composite (graphite epoxy) liquid hydrogen tank; a composite intertank; and a liquid-to-gas converter assembly in the flight reaction control system. McDonnell Douglas will design and develop most of these components and conduct the flight tests for NASA. They will share some of the costs of the DC-XA. Hardware costs are \$20 million and integration costs are \$30 million. Phillips Laboratory at Kirtland Air Force Base [Albuquerque, NM] will act as NASA's deputy for Flight Test and Operations for the DC-XA. NASA field centers supporting the DC-XA include Marshall; Langley Research Center [Hampton, VA]; and the Dryden Flight Research Center [Edwards, CA]. [NASA/KSC Release No. 95-114, July 20, 1995.]

July 21:

LANDING DELAYED ON STS-70

Discovery, scheduled to land at Kennedy Space Center's Shuttle Landing Facility today, was waved-off due to fog at KSC and is now scheduled to land on Saturday, July 22. Managers informed the crew of **Discovery** that the weather at KSC for both opportunities today (7:54 a.m. and 9:30 a.m.) was unacceptable and another try will be made tomorrow. Saturday's KSC landing opportunities are at 6:26 a.m. and 8:02 a.m. EDT. A landing opportunity is also available at Edwards Air Force Base, CA, at 9:29 a.m. EDT. The crew for mission STS-70 are: Commander **Terence T. Henricks**, Pilot **Kevin R. Kregel**, and Mission Specialists **Donald A. Thomas**, **Nancy Jane [Sherlock] Currie** and **Mary Ellen Weber**. The principal payload of the STS-70 was the TDRS-G satellite which was launched on Day-1 of the mission. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 21, 1995.]

FIVE GET SNOOPYS

Five NASA/KSC employees recently were presented with NASA's prestigious Silver Snoopy Award for service to the Space Shuttle astronauts. Astronaut **Steven L. Smith** presented awards at KSC in June to **Rebecca J. Kleinschmidt** (Merritt Island) and **Jeane S. O'Bryan** and **Patsy H. Fuller** (Titusville). Astronaut **Marsha S. Ivins** gave out awards, also in June, to **Paul E. Paulick** and **David W. Burris** (Titusville). Kleinschmidt, personal assistant to the NASA Director of Safety, Reliability and Quality Assurance, was commended for her ability to handle a heavy workload and adapt to constantly changing schedules. "You exemplify world-class quality in all you do and provide a visible, inspirational focus on the importance of establishing and meeting the highest quality standards," Smith told her. The other four recipients are in the Payloads Operations Directorate. A systems engineer, O'Bryan was applauded for her part in overseeing the operation and maintenance of various aspects of the Payload Operation Network, which provides computer network communications in support of payload processing. "Your efforts have benefited the processing of Shuttle payloads and will continue to provide new benefits as the electronic linking of the day-to-day exchange continues," astronaut Smith said.

Fuller, lead secretary and personal assistant to the director of Payload Operations, was congratulated for performing her duties in an outstanding manner, and gave above and beyond expectations. "You show excellent judgment in carrying out your responsibilities and have gained the respect of both internal and external customers for your ability to get the job done," Smith told her. Paulick, lead engineer for the Partial Payload Checkout Unit (PPCU) sustaining engineering activities, was recognized for leading a joint NASA/contractor team that was responsible for three computer software releases during the last year. "The exceptional manner in which you have carried out your responsibilities exceeds normal requirements and demonstrates pride in your work," astronaut Ivins told him. Burris was commended for his efforts in reducing acquisition cost and operation and maintenance costs for Space Station processing at KSC. "These initiatives (you introduced) have resulted in a total cost avoidance to the program of \$1 million," Ivins said. Snoopy, of the comic strip "Peanuts," has been the unofficial mascot of NASA's astronaut corps since the earliest days of manned spaceflight. The Silver Snoopy Award was created by the astronauts to honor persons who contribute most to the safety and success of manned spaceflight. The award is presented to no more than 1 percent of the space center's work force each year. Recipients are given a silver pin depicting the famous beagle wearing a space suit. All the pins have flown on a previous Space Shuttle mission. The award winners also received a framed certificate and a congratulatory letter signed by the presenting astronaut. [NASA/KSC Release No. 70-95, July 21, 1995.]

PROCESSING UPDATES

The terminal countdown demonstration test for STS-69 has now been completed and the interface verification test for the Wake Shield Facility-2 payload is underway at Launch Complex 39A. STS-69 scheduled activities: replace valve that services hypergolic reactants in the right-hand OMS pod (July 23-24); begin Orbiter aft engine compartment closeouts (July 25); check-out of spacesuits (EMUs) for flight (July 27); installation of ordnance (July 28) and commencement of mission countdown (August 2). In Orbiter Processing Facility Bay 3, work continues on **Columbia** to prepare it for rollover to the VAB prior to its STS-73 launch. Main engines have been secured and the tunnel adapter has undergone pressure checks. Today, technicians will prepare to install the Spacelab transfer tunnel and repair the attach point on the right-hand orbital maneuvering system pod. The crew interface test is set for July 29; payload bay doors are to be closed August 7 and the rollover to the VAB is planned for August 18. Meanwhile, **Atlantis** is being readied for its STS-74 mission, the second docking with the Russian Mir Space Station. Next week, Orbiter windows 5 and 6 will be replaced and the landing gear and tires will be removed. Also, preparations are in work to remove the main engines (July 24-25). [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 21, 1995.]

July 22:

STS-70: LANDING DAY

Mission Managers gave the crew of **Discovery** the go for de-orbit burn at about 6:50 a.m. to permit a landing at Kennedy Space Center's Shuttle Landing Facility today. Landing occurred at 8:02 a.m. on runway 33, concluding its 9-day mission which featured the deployment of a Tracking and Data Relay Satellite. **Discovery** had been scheduled to land yesterday at KSC, but was waved-off due to low clouds and fog. At about 11:30 a.m. today, **Discovery** will be towed to Orbiter Processing Facility Bay 1 where post-flight deservicing will begin. Later, preparations will be made for **Discovery** to be ferried to Palmdale, CA, where it will spend about 9 months undergoing standard refurbishment and modifications to support future flights to the International Space Station. **Discovery** is scheduled to be delivered to the Rockwell facility in Palmdale around the first of October and returned to KSC in July 1996. **Discovery's** next flight is not scheduled to occur until early 1997, the second mission to re-visit the Hubble Space Telescope. The crew for STS-70 are: Commander **Terence T. Henricks**, Pilot **Kevin R. Kregel** and Mission Specialists: **Donald A. Thomas**, **Nancy Jane [Sherlock] Currie** and **Mary Ellen Weber**. The forecast for landing today includes the possibility of early morning fog; weather is expected to be favorable for a landing at Edwards Air Force Base in California. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 22, 1995; STS-70 Landing Weather Forecast, July 22, 1995.]

July 24:

STS-69: TESTS COMPLETED

Technicians at Launch Complex 39A have completed the Wake Shield Facility-2 interface verification test (IVT), the terminal countdown demonstration test and the Wake Shield Facility/Spartan 201-203 astronaut inspection. Pad techs are currently at work on the removal and replacement of the right-hand OMS/RCS quick disconnect. STS-69 work scheduled includes: aft main engine compartment closeouts, stowage of flight crew equipment; WSF battery charging and replenishment and replacement of the pad's liquid hydrogen storage sphere. **Discovery** was towed from Runway 33 at the Shuttle Landing Facility starting at 11:45 a.m. EDT on Saturday morning. It arrived in front of OPF Bay 1 at 1:02 p.m. EDT and was spotted in the high bay at 1:05 p.m. EDT. Over the weekend the residual cryogenic reactants were offloaded. Today access into the aft main engine compartment is being established and the payload bay door strongback is being attached in preparation for opening the payload bay doors on Tuesday. Preparations are underway for offloading the residual hypergolic propellants. The Spacelab tunnel connecting the Orbiter's airlock with the USML-2 laboratory module is being installed today. The crew equipment interface test (CEIT) of **Columbia** and USML-2 is scheduled for Saturday. A functional test of the forward reaction control system of **Atlantis** is underway today. The main engine heat shields have been removed and preparations are underway for removing the three main engines. The STS-71 latch assembly on the Orbiter docking system has been removed. The latching mechanism for STS-74 and subsequent missions is now undergoing installation. On the Russian docking module in the Space Station Processing Facility, the grapple fixture and payload bay trunnions were installed on Friday, July 21. [KSC Space Shuttle Status Report, July 24, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 25, 1995.]

July 27:

STS-69: SPACESUITS INSTALLED

The STS-69 mission spacesuits have been installed in **Endeavour's** airlock. Today, workers will conduct aft engine compartment closeouts, stowage of flight crew equipment, checkout spacesuits (EMUs) for flight and charge the Wake Shield Facility's batteries. Tomorrow, technicians will close **Endeavour's** payload bay doors for flight and install ordnance devices. The STS-69 crew is expected to arrive August 2 at 12:30 p.m. and the countdown should commence at 3 p.m. The Shuttle mission which follows STS-69 is **Columbia's** STS-73 U.S. Microgravity Laboratory-2 mission. Today, in OPF Bay 3, technicians will install the Orbiter's main engine heat shields and, on the 29th, they will conduct a crew equipment interface test. **Columbia's** payload bay doors will be closed on August 4 and the vehicle will rollover to the Vehicle Assembly Building on August 18. **Atlantis**, back in OPF Bay 2, is being readied for its second docking mission with the Russian Mir Space Station. The STS-74 mission is targeted to begin October 26 and end at Kennedy Space Center's Shuttle Landing Facility with a landing planned for November 3. The fuel cells of the vehicle have been tested and preparations are underway to remove from the vehicle the forward reaction control system and send it to the Hypergolic Maintenance Facility to replace a valve that failed during a functional test

earlier in the week. The drag chute hardware will be removed on August 1 along with the FRCS. The Remote Manipulator System [RMS] will be installed on August 2. **Discovery** is scheduled to be delivered to Palmdale, CA, for a nine-month Orbital Maintenance Down Period (OMDP). During this time, the vehicle will be outfitted with a 5th set of cryogenic tanks and external airlock to support missions to the International Space Station. **Discovery** is scheduled to depart Kennedy Space Center atop the Shuttle Carrier Aircraft (SCA) on or about September 26. **Discovery's** next flight, the second mission to service the Hubble Space Telescope, is targeted for launch in early 1997. This week, post-flight servicing will continue in OPF Bay 1. Preparations are underway to remove the forward reaction control system (FRCS) on August 9 and the Space Shuttle main engines (SSMEs) on August 10. The IUS payload hardware will be removed earlier, on July 28. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 27, 1995.]

July 28:

O-RINGS A CONCERN ON STS-69

STS-69 Mission Managers will meet later today to discuss concerns with an O-Ring seal on an internal joint in the nozzles of the solid rocket boosters. Managers from all NASA flight centers will gather to discuss the problem and any potential impact to **Endeavour's** scheduled launch next week. A briefing to news media is currently scheduled to follow the management meeting. Meanwhile, the Spartan 201 payload closeout has been completed; the spacesuits have been checked out for flight and the Wake Shield Facility batteries have been charged. Ordnance installation will occur over the weekend and the crew arrives at 12:30 p.m. August 2; countdown commences on August 2 at 3 p.m. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 28, 1995; Banke, FLORIDA TODAY, July 19, 1995.]

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BIRD INVESTIGATION PRELIMINARY FINDINGS

KSC's Bird Investigation Review and Deterrent (BIRD) Team recently completed its initial review of the problem that caused the delay of mission STS-70 earlier this year. The flight of **Discovery** was postponed because of flicker woodpeckers attempting to nest in the foam insulation of the vehicle's external tank over the Memorial Day weekend while **Discovery** was being prepared for launch at pad 39B. The report includes background and historical data and characterizes some of the behavioral aspects of the flicker woodpeckers. The BIRD team drew significant conclusions from the data collected and made recommendations for a long term habitat and monitoring program. In addition, the BIRD team evaluated a wide variety of products and services, the results of which are detailed in the report. After consultations with leading ornithologists and wildlife experts, the BIRD team concluded that the migratory Northern Flicker Woodpeckers were attempting to excavate a cavity in the external tank because they may have lost a nest or roost cavity to starlings. If a nest is overtaken before the female can lay her eggs, the pair become desperate for a nest, the report explains. This may explain the unusually aggressive behavior of the flicker pair that damaged the tank. In an effort

to keep this problem from recurring and to reduce NASA's exposure to risk of flight hardware damage, the BIRD team has recommended a three-phased long-term plan. Phase 1 involves establishing an aggressive habitat management program to make the pads more unattractive to flickers and to disperse the resident population of flickers. Phase 2 includes the implementation of scare and deterrent tactics at the pads. Phase 3 is the formal implementation of bird sighting response procedures. Though significant inroads were made in dealing with the woodpecker problem that ultimately caused **Discovery** to be rolled back to the Vehicle Assembly Building for repairs to the external tank, the team will continue efforts to develop a long-term system of effective deterrents at the pads. [NASA/KSC News Release No. 73-95, July 28, 1995; Borenstein, THE ORLANDO SENTINEL, July 7, 1995.]

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PROCESSING UPDATE

Today, technicians in OPF Bay 3 have made preparations for the crew equipment interface test which is planned for tomorrow. Aft engine closeouts are being conducted today as well. The payload bay doors will be closed August 4 and rollover to the Vehicle Assembly Building is targeted for two days later, August 6. In OPF Bay 2, preparations are underway to remove from **Atlantis** the forward reaction control system and send it to the Hypergolic Maintenance Facility to replace a valve. Key operational milestones for **Atlantis** (OV-104) are removal of the vehicle's drag chute hardware and forward RCS on August 1 and installation of the remote manipulator system [RMS] on August 2. **Discovery** is scheduled to be delivered to Palmdale, CA, for a nine-month Orbital Maintenance Down Period (OMDP). During this time, the vehicle will be outfitted with a 5th set of cryogenic tanks and an external airlock to support missions to the International Space Station. **Discovery** is scheduled to depart Kennedy Space Center via the 747 Shuttle Carrier Aircraft on or about September 26. **Discovery's** next flight, the second mission to service the Hubble Space Telescope, is targeted for launch in early 1997. This week, post-flight servicing will continue in OPF Bay 1. Preparations are underway to remove the forward reaction control system and the main engines. The vehicle's inertial upper stage payload hardware is scheduled for removal today. Technicians will remove the forward reaction control system on August 9 and the main engines on August 10. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 28, 1995.]

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ENDEAVOUR LAUNCH TO BE DELAYED

Following a briefing by a special assessment team, NASA managers have decided to postpone the August 5th launch of Space Shuttle **Endeavour** on Mission STS-69 in order to finish a review of flight hardware associated with O-Rings in a nozzle joint of the Reusable Solid Rocket Motor (RSRM). Launch of **Endeavour** is now targeted for no earlier than mid-August. The inspection team was formed to address an issue which came out of a post-flight assessment of boosters used for the last two Shuttle launches. During their inspections, engineers found that a gas path in the RSRM nozzle internal

joint number 3 had extended from insulation in the motor chamber to, but not past, the primary O-Ring. While gas paths to the primary O-Ring have been observed in previous nozzles, the last two flights the gas path resulted in a slight heat effect to the primary O-Ring seal. After reviewing several different aspects of the RSRM system, the team has concluded that there are no concerns with the design of the nozzle joint. While there are no design issues, the team is looking at a procedure which would allow inspection and minor adjustments to the application of a thermal barrier, referred to as RTV, or Room Temperature Vulcanizing, which may further reduce the possibility of a gas path reaching the primary O-Ring. "This review has been a first-rate effort from the entire space flight team" said **Brewster Shaw**, Director, Space Shuttle Operations at Johnson Space Center. "We've had good representation and coordination between the various NASA organizations and Thiokol and this issue is being thoroughly reviewed. While the hardware at the launch pad would probably operate just as expected during launch, we are going to take the time to ensure the Shuttle is in the absolute best condition for flight. Safety has been, is, and will remain our top priority with this program." Shuttle managers expect to receive another briefing by the RSRM assessment team at the end of next week. They plan to wait until the assessment team has concluded its efforts before determining a new launch date for **Endeavour**. [NASA/KSC Release No. 95-130, July 28, 1995.]

July 31:

STS-69: LAUNCH ON INDEFINITE HOLD

Mission Managers for STS-69 decided late last Friday [July 28] to place the launch of **Endeavour** on indefinite hold in order to finish a review of flight hardware associated with O-Ring seals in a nozzle joint of the solid rocket boosters. During the next several days, engineers will determine what additional work and inspections are necessary to alleviate concerns which came out of post-flight assessments of boosters used for the last two Shuttle launches. After reviewing the data from these missions, no concerns with the booster design were found. However, engineers will focus on the technique used to apply a thermal barrier called RTV [Room Temperature Vulcanizer] around the O-Ring seal in the nozzles. Managers expect to receive another briefing by the end of the week. The vehicle's payload bay doors have been closed for flight. Orbiter aft engine closeouts are being implemented today. Target dates are not yet determined for the following milestone events: installation of ordnance and pressurization of hypergolic reactant tanks; crew arrival; commencement of countdown for STS-69. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 31, 1995.]

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STS-73: U.S. MICROGRAVITY LABORATORY-2

Columbia continues to undergo pre-rollover processing for STS-73 in Orbiter Processing Facility Bay 3. Today, technicians in Bay 3 are conducting aft engine compartment and Orbiter mid-body closeouts. The payload bay doors will be closed August 4 and rollover to the Vehicle Assembly Building is set for August 16. Meanwhile, **Atlantis** is being readied for its second Mir docking mission targeted currently for an October 26 launch.

Preparations are underway to remove the forward reaction control system tomorrow and to send the FRCS to the Hypergolic Maintenance Facility to have a valve replaced. Removal of both the FRCS and the drag chute hardware is planned for August 1; installation of the robotic arm [RMS] is set for August 2. **Discovery** is scheduled for an OMDP in Palmdale, CA, this fall. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, July 31, 1995.]

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ROLLBACK TO VAB POSSIBLE

NASA Managers at Kennedy Space Center today are making preliminary preparations to roll the Shuttle **Endeavour** back to the Vehicle Assembly Building as Tropical Storm Erin approaches the east coast of Florida. Only preparations are being made at this time. The decision to roll back or not to roll back will be made at about 6:00 a.m. Tuesday, August 1. If the decision to roll back is made, **Endeavour** will be in a posture to begin the move back to the VAB at 10:00 a.m. Tuesday. The 7-hour trip from Launch Complex 39-A to the VAB will be completed well ahead of any potential for damaging high winds and rain. These roll back preparations are being made just as a precaution, in the event Erin increases in strength and turns further north. **Endeavour's** launch remains on indefinite hold pending engineering analysis on the solid rocket booster nozzle O-Ring seals. [NASA/KSC Press Release, July 31, 1995.]

AUGUST

August 1:

SPACE SHUTTLE STATUS REPORT

NASA Managers have made the decision to roll **Endeavour** off Launch Complex 39A and return it to the Vehicle Assembly Building as Hurricane Erin approaches the east coast of Florida. Overnight, preparations were made to roll the vehicle back to the VAB as Erin began to strengthen and turn in a more northerly direction. An empty mobile launcher platform was moved out of VAB high bay 1 to make room for **Endeavour**. A complete solid rocket booster stack, slated for STS-73, is currently in high bay 3. First motion is expected at about 12 noon today. The 5-6 hour trip from 39A to the VAB will be completed well ahead of any potential for high winds and rain. **Endeavour's** launch remains on indefinite hold pending engineering analysis on the solid rocket booster nozzle O-ring seals. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Aug. 1, 1995.]

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SOHO ARRIVES AT KSC FOR ATLAS LAUNCH

The Solar and Heliospheric Observatory (SOHO) of the European Space Agency (ESA) arrived at the Shuttle Landing Facility today from Toulouse, France, aboard an Air France 747 cargo plane. The SOHO spacecraft will carry a complement of eleven instruments from ESA and NASA and is part of a larger effort known as the International Solar-Terrestrial Physics (ISTP) science initiative. SOHO will have a superlative view of the Sun from a circular orbit around a point known as the "L-1 Lagrangian point." This is located approximately 930,000 miles from Earth and is where the gravitational forces of the Earth and Sun balance one another. SOHO will then study the origin of the energy within the Sun which reaches the Sun's surface. Part of this energy is transported to Earth as solar wind. SOHO will receive final testing and preparation for launch in the Spacecraft Assembly and Encapsulation Facility (SAEF-2) located in the KSC Industrial Area. Several processing activities will take place on the payload module to prepare the science instruments for launch. Also, the solar arrays will be attached with the service module which holds the spacecraft subsystems. All of the instruments will be checked out as part of an overall spacecraft functional test and a compatibility check with NASA's Goddard Space Flight Center in Greenbelt, MD. The high gain communications antenna will also have a test release and the spacecraft communications and data systems will be checked. The thermal blanket insulation will be attached and the spacecraft control propellant loaded aboard. SOHO is approximately 12.5 feet in height by 12.1 feet in diameter and weighs approximately 4,080 pounds. It was manufactured in France by Matra Marconi under a contract with the European Space Agency. In mid-October the spacecraft is scheduled to be transported to Pad B at Launch Complex 36 for mating with the Atlas IIAS, an Atlas Centaur launch vehicle featuring two solid rocket boosters. Lockheed Martin manufactures the launch vehicle and is under contract with the NASA Lewis Research Center to provide the launch services. The Kennedy Space Center is responsible for the government technical

oversight of launch vehicle preparations and the launch day countdown activities. The liftoff is targeted to take place between October 31 and November 7, 1995. ESA has the overall mission responsibility while NASA is responsible for the collection and dissemination of the SOHO science data through the Goddard Space Flight Center and the Deep Space Network at the Jet Propulsion Laboratory, Pasadena, CA. NASA's participation in the SOHO program is managed by the Space Physics Division of NASA Headquarters. [NASA/KSC Release No. 75-95, Aug. 1, 1995.]

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KSC HURRICANE PREPARATIONS

Hurricane preparations are underway at the Kennedy Space Center anticipating that KSCX will go to Condition 1 (Full Alert) some time this evening. The direct effect of Hurricane Erin at KSC may be felt about midnight tonight. The storm is currently expected to make landfall between 6 a.m. and 8 a.m. on Wednesday morning near Vero Beach. It is forecast to exit the state into the Gulf of Mexico near Crystal River. Wind at KSC is forecast to be of tropical storm strength with steady state winds of 55 knots (63 mph) with gusts up to 65 knots (75 mph). The storm surge will occur at low tide around day break and is expected to be three to five feet above normal. Approximately 5-8 inches of rain is expected at KSC over a 36 hour period. Some local flooding is expected. A Hurricane Warning extends from south Florida northward to New Smyrna Beach. On Wednesday heavy rain is forecast with winds 25-35 knots (29 mph-40 mph), gradually diminishing Wednesday evening. It is anticipated that the KSC Hurricane Control Center will be activated tonight beginning at midnight. Rollback of Space Shuttle **Endeavour** began at 12:45 p.m. and it is expected to be in the Vehicle Assembly about 6 p.m. It will ride out the storm in high bay one and will be returned to Pad A as soon the storm effects have passed. The other Orbiters will remain in the Orbiter Processing Facility, **Discovery** in OPF Bay 1, **Atlantis** in OPF Bay 2, and **Columbia** in OPF Bay 3. The Orbiter Processing Facility is designed to withstand winds of 105 mph, the VAB and the launch pads 125 mph, and the payload facilities 110 mph. [NASA/KSC News Release, Aug. 1, 1995.]

August 2:

KSC HURRICANE STATUS REPORT

The eye of Hurricane Erin made landfall at Vero Beach at 1:11 a.m. today. Weather conditions at KSC were as forecast with steady state winds about 60 mph with gusts to 75 miles per hour. Damage to KSC has been minimal. Most areas of Brevard County have sustained more damage than has occurred at KSC. The most serious problem was at the Vertical Processing Facility where the louvered doors to the facility air lock were seriously damaged. However, the inner door to the VPF clean room remained fully intact. Other minor damage included two 10-foot by 20-foot panels loosened from the east side of the pedestrian bridge corridor connecting the Launch Control Center with the Vehicle Assembly Building. There was also an overturned construction trailer and a window of a government vehicle which was blown out. While there were some trees blown down, electrical power at KSC was never lost. There was some minor water

intrusion in OPF Bay 1. All flight hardware was unaffected. Because access to and from KSC is difficult due to temporary bridge closures, downed trees and power lines, Center Director **Jay F. Honeycutt** has canceled all employee work shifts for today. Regular work will resume with first shift on Thursday. [KSC Hurricane Status Report, Aug. 2, 1995.]

August 3:

STS-69: ROLLOUT PREPARATIONS MADE

A definite date for rollout is expected to be announced tomorrow. No target date for launch has been set at this point. Preliminary preparations for rollout are being made today. Rollback to the VAB began August 1 at 12:42 p.m.; **Endeavour** arrived in VAB Bay 1 by 6:20 p.m. and the VAB doors were closed twenty minutes later in anticipation of landfall for Hurricane Erin. Mechanical and electrical disconnections have been completed. The crew hatch and payload bay doors were opened on all three Orbiters in the Orbiter Processing Facility. The vehicles were powered in order to resume processing activities on the departure from the are of Hurricane Erin. **Columbia's** Ku-band antenna is being extended today to begin testing. A functional test of **Atlantis'** orbital maneuvering system is being performed, the aft flight deck reconfiguration to support the Russian Docking Module is underway and the vehicle's forward reaction control system is being removed for servicing. Draining of residual hypergolic fuels from **Discovery** will resume during the night. The peak wind in the Kennedy Space Center/Cape Canaveral vicinity during Hurricane Erin was recorded at a wind tower just west of Port Canaveral which was 82 mph from the East-Southeast. [KSC SPACE SHUTTLE STATUS REPORT, Aug. 3, 1995.]

August 4:

STS-69 STATUS REPORT

A final decision on rolling **Endeavour** back to Launch Complex 39A will be made August 7. Work to qualify **Endeavour's** solid rocket boosters for flight is not expected to begin at KSC until the end of next week. No assessment date for launch has been established. Preliminary rollback preparations have been completed and, today, technicians are conducting a powered on state of health check. Rollback to the launch site will come no earlier than 2:00 a.m. on August 8; pad validations will come on Tuesday and Wednesday. The STS-69 flight readiness test will occur on August 10. [KSC SPACE SHUTTLE STATUS REPORT, Aug. 4, 1995.]

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O-RING STATUS REPORT

Shuttle Managers today received a second briefing by the special assessment team that is examining the issue of an observed gas path in the RSRM nozzle internal joint number 3 extending to, but not past, the primary O-Ring. While gas paths have been observed in previous nozzles, the last two flights saw the gas path result in a slight hat effect to the first of the two O-Ring seals. During their first meeting with Shuttle Managers last Friday, the team presented data which showed there were no issues with the design or

operation of the flight hardware. The team did find what they believe is the probable cause of the gas paths in the insulation material. During standard application of the insulation, it was shown that a small amount of air can become trapped in the are to be filled. These small voids can then allow hot gas to move through the insulation during motor operation. The team's efforts for the past week have focused on two areas. The first is developing different non-destructive evaluation techniques (X-Ray, ultrasound, computed tomography) for examining the insulation material-known as Room Temperature Vulcanizing or RTV - to identify any small voids which may exist. The second effort has been to develop a method for making repairs to the RTV material. Development of the NDE techniques shows a great deal of promise but has gone slower than expected and the team still needs to verify that the techniques will identify any and all voids in the insulation. The team has developed a method for making repairs to the insulation. The procedure involves removing old RTV then applying new RTV under a vacuum condition which prevents any air pockets from forming. Tests on demonstration and full-scale models have verified this repair technique. Since the NDE techniques may not prove to effectively find all air pockets, Shuttle Managers are considering using the repair technique as a way of removing and replacing RTV through the entire 360 degree area of the joint. Space Shuttle **Endeavour** scheduled to fly the next mission was rolled from the launch pad to the Vehicle Assembly Building earlier this week because of Hurricane Erin. NASA Managers expect to roll **Endeavour** back out to Launch Complex 39A early next week and RTV repair work will be done at the pad. Shuttle Managers and the special assessment team will meet again next Friday, August 11th, to discuss updates on the NDE inspection, the RTV repair work and the Shuttle processing schedule. Launch of **Endeavour** and Mission STS-69 is currently planned for no earlier than late August. [NASA/KSC News Release: N95-52, Aug. 2, 1995; RSRM O-RING STATUS REPORT, Aug. 4, 1995.]

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SHUTTLE PROCESSING UPDATES

Columbia [STS-73]: A functional test of the landing gear was completed this morning. Testing of the flight controls is underway and Orbiter mid-body closeouts are in work. Testing of the Ku-band communications system continues. Water proofing of the Orbiter's tiles will begin on Sunday. Scheduled next week is a Spacelab interface electrical check and an Orbiter structural test. The payload bay doors will be closed for flight about next Tuesday night [August 15]. In the Vehicle Assembly Building, the external tank will be mated to the solid rocket boosters on Saturday. Rollover of **Columbia** to the VAB for mating to the ET/SRB stack is currently projected to occur on August 21 with rollout to Pad 39B on August 26. **Atlantis** [STS-74]: Functional tests of the orbital maneuvering system and the auxiliary power units are being performed today. The forward reaction control system is scheduled to be removed tonight and taken to the Hypergolic Maintenance Facility for routine work. The Orbiter's wheels and tires were installed last night. Modifications to the Orbiter docking system continue. In the Space Station Processing Facility, the solar arrays have been attached to the Russian Docking Module. A pressure test of the module is scheduled for next

week. **Discovery** [Ferry Flight Preparation]: The OPF Bay 1 is cleared of personnel for the draining of residual hypergolic fuels which began last night and is scheduled to conclude over the weekend. [KSC SPACE SHUTTLE STATUS REPORT, Aug. 4, 1995.]

August 7:

ENDEAVOUR ROLLS OUT AUGUST 8

The Space Shuttle **Endeavour** is scheduled to roll out from the Vehicle Assembly Building to Launch Complex 39A tomorrow at 2 a.m. EDT. The six-hour trip will place the vehicle back at the pad by mid-morning. **Endeavour's** launch remains on indefinite hold pending engineering analysis and repair of the solid rocket booster nozzle O-Ring seals. Preparations for rollout have been made in the VAB today. Mechanical and electrical connections will be made once the Shuttle is harddown on the pad. The main engine flight readiness test is set for August 10 as is the setup for solid rocket booster nozzle repairs. Engineering analysis has indicated that **Columbia's** number 2 main engine is unacceptable for flight and will be removed and replaced with an engine originally slated to fly on mission STS-74. The engine replacement has delayed **Columbia's** move to the Vehicle Assembly Building by about five days. Today, technicians in OPF Bay 3 will conduct a final cleaning of the vehicle's payload bay; aft engine compartment and Orbiter mid-body closeouts will also be implemented. The suspect main engine number 2 will be replaced August 10-11. Rollover to the VAB is planned for August 21 with rollout to Launch Complex 39B targeted for August 26. Preparations are underway to remove **Atlantis'** forward reaction control system later this week and send it to the Hypergolic Maintenance Facility to replace a faulty valve. Main engine installation is planned for August 24-25. **Discovery**, meanwhile, is being prepared for its ferry flight to Palmdale, CA, for its Orbiter Maintenance Down Period. OPF Bay 1 technicians plan to remove **Discovery's** forward reaction control system on August 9 and its main engines on August 11. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Aug. 7, 1995.]

August 8:

ENDEAVOUR RETURNS TO LC 39-A

The Space Shuttle **Endeavour** was returned to Launch Complex 39-A this morning with first motion from the Vehicle Assembly Building occurring at about 1:55 a.m. (**Endeavour** was moved off the pad to the VAB on August 1 as Hurricane Erin approached the east coast of Florida.) The vehicle was spotted at the pad at about 8:30 a.m. today. **Endeavour's** launch remains on indefinite hold pending engineering analysis and repair of the solid rocket booster nozzle O-Ring seals. Booster repairs are expected to begin early next week. Pad validations are underway today along with tests of mechanical and electrical connections. The main engine flight readiness test is targeted for August 10. Setup for solid rocket booster repairs also commences on August 10. The STS-69 mission will feature two major payloads: the Wake Shield Facility-2 and Spartan 201-203. **Columbia** remains in OPF Bay 3 where engineering analysis has indicated that the no. 2 main engine is unacceptable for flight; it will be removed and

replaced with an engine which was to have flown on STS-74. The engine replacement has delayed **Columbia's** move to the Vehicle Assembly Building by about two days. Today, technicians are continuing to clean the vehicle's payload bay, making aft engine compartment and Orbiter mid-body closeouts and conducting Orbiter structural inspections. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Aug. 8, 1995.]

August 9:

STS-69: RSS CLOSED

Endeavour is back on the pad and the rotating service structure [RSS] is now closed around the vehicle. Pad umbilical connections and validations are underway and scaffolding has been built-up for impending solid rocket booster work. A main engine frequency response test has been planned for tomorrow; on Friday [August 11], pad technicians will begin solid rocket booster work by removing nozzle throat plugs. Testing of **Columbia's** Ku-band communications and radar system continues in OPF Bay 3 and will be completed this evening. USML module closeouts have been completed and the payload bay doors are planned for closure overnight. Preparations are underway from removing **Columbia's** #2 main engine; the removal is planned to occur August 13. Engine re-installation is scheduled for August 14. Aft main engine compartment closeouts in preparation for **Columbia's** rollover to the Vehicle Assembly Building are continuing. Rollover is currently planned for August 21 with rollout from the VAB to Launch Complex 39B targeted for August 28. The terminal countdown demonstration test [TCDT] is set for September 1. The TACAN and S-Band communications systems of **Atlantis** are being tested today. Functional tests of the orbital maneuvering system and the auxiliary power units are continuing. The forward reaction control system has been removed and is rescheduled to be taken to the hypergolic maintenance facility tonight. In the Vehicle Assembly Building, stacking of the STS-74 solid rocket boosters is underway. Also, modifications to the orbiter docking system electrical system are being performed. In the Space Station Processing Facility, pressure testing of the Russian Docking Module has been completed and closeouts are beginning in preparation for moving the module to the Operations and Checkout Building next week. [KSC SPACE SHUTTLE STATUS REPORT, Aug. 9, 1995.]

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DELTA/XTE STATUS REPORT

Work to prepare the X-Ray Timing Explorer for launch continues at NASA Spacecraft Hangar AO on Cape Canaveral Air Station. Current work includes final installation of the All Sky Monitor instrument. Upcoming is installation of the spacecraft onto the Delta payload attach fitting in preparation for going to the launch pad and mating with the second stage of the Delta launch vehicle. Major milestones achieved since the payload arrived at Hangar AO on May 31 include: changeout of one of the Proportional Counter Array detectors completed on June 12; completion of a 5-day spacecraft performance test on June 29; installation of the spacecraft batteries on July 1; a spacecraft launch simulation on July 16; completion of a mission simulation on July 19

covering the early hours of flight after separation from the Delta. This included deployment of antennas and the solar arrays. At Pad A on Complex 17, erection of the Delta first stage occurred on July 22. The nine strap-on solid rocket boosters were attached in sets of three between July 24-26. The second stage was hoisted for erection atop the first stage on July 28. The tri-section fairing was hoisted into the white room at the launch pad on August 8. Processing of the vehicle is continuing at this time. Upcoming activities include a partial tanking of liquid oxygen on the first stage on August 19 for cryogenic leak checks, a Simulated Flight Test of the vehicle on August 21-22 which checks the in-flight functions of the Delta after T-0, and a pair of launch crew certifications, which includes a launch countdown and full tanking of the vehicle with liquid oxygen on August 23 and August 25. The launch date for Delta/XTE is indefinite at this time pending completion of flight qualification of upgraded avionics for the vehicle and the investigation into the failure of a solid rocket booster to separate from the Delta first stage during the recent launch of Koreasat-1. [Delta/XTE Status Report, Aug. 9, 1995.]

August 10:

SRB REPAIR WORK TO BEGIN

Workers at Launch Complex 39A have begun erecting the scaffolding necessary for repairs of **Endeavour's** solid rocket boosters and are preparing for the main engine Frequency Response Test. Nozzle throat plugs will be removed from the main engines tomorrow. Meanwhile, in Orbiter Processing Facility Bay 3, testing of **Columbia's** Ku-band communications and radar system has been completed. Preparations continue for removing **Columbia's** #2 main engine which is now scheduled to begin tomorrow. Aft main engine compartment closeouts are in preparation for the vehicle's rollover to the Vehicle Assembly Building. During payload bay cleaning a ding was found in payload bay door radiator #3; it will receive ultrasound and X-Ray testing to assure that the radiator has not been damaged and will then undergo a ding repair procedure. Payload bay door closure will be rescheduled after this repair work is complete and the impact on the planned rollover to the VAB is being assessed. Functional tests of **Atlantis'** orbital maneuvering system and the auxiliary power units are continuing. The forward reaction control system has been removed and was taken to the hypergolic maintenance facility last night. It will be reinstalled on the Orbiter in about three weeks. The payload bay of **Atlantis** is being reconfigured for the Russian Docking Module. In the Vehicle Assembly Building, stacking of the solid rocket booster propellant segments is now scheduled to begin tomorrow. Modifications to the Orbiter Docking System's electrical system are being performed. In the Space Station Processing Facility, a final pressure test of the Russian Docking Module is being performed today and will be followed with module closeouts in preparation for moving it to the Operations and Checkout building on August 18. Preparations for removing **Discovery's** three main engines are also underway in OPF Bay 1. In addition, workers are preparing to removing the vehicle's forward reaction control system. The No. 3 fuel cell is being removed and replaced. **Discovery's** 747 ferry flight to Palmdale is planned to commence on or about October 1. [KSC SPACE SHUTTLE STATUS REPORT, Aug. 10, 1995.]

August 11:

STS-69: LAUNCH REMAINS ON HOLD

Endeavour's STS-69 launch remains on indefinite hold pending engineering analysis and repairs to the solid rocket booster nozzle O-Ring seals. Erection of scaffolding to access the booster nozzles is in work today. Repairs are expected to begin this weekend. A program briefing to the media is scheduled for this afternoon and is expected to address this issue. STS-69 work scheduled: ordnance installation and hypergolic fuel pressurization; crew arrival and start of launch countdown. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Aug. 11, 1995.]

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COLUMBIA, ATLANTIS PROCESSING UPDATES

In OPF Bay 3, technicians will close **Columbia's** payload bay doors today. Key operational milestones for STS-73 processing: aerosurfaces and flight control frequency response testing; removal and replacement of main engine number 2; rollover to the Vehicle Assembly Building and rollout to Launch Complex 39B on August 28. Meanwhile, preparations are underway to install the tunnel adapter next week on **Atlantis**. Installation of the vehicle's drag chute will take place beginning today and continue through this weekend. Key operational milestones for STS-74: commencement of stacking operations for the mission's solid rocket boosters in the Vehicle Assembly Building and installation of the Space Shuttle main engines planned for August 24-25. In OPF Bay 1, **Discovery** is being prepared for its ferry flight to Palmdale, CA, where it will undergo an Orbiter Maintenance Down Period (OMDP). **Discovery's** main engines will be removed on August 11 and 12 in preparation for its ferry flight. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Aug. 11, 1995.]

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DOCKING MODULE TRANSFER CEREMONY

The Russian-built MIR-2 Docking Module, the primary payload of the STS-74 mission, will be received by NASA in a ceremony to mark a transition to prepare it for integration with the Space Shuttle **Atlantis**. The event will be held August 14 and will begin at 11:30 a.m. in the high bay of the Space Station Processing Facility in front of the docking module. The primary objective of the STS-74 mission planned for late October is to dock the MIR-2 Docking Module to the Krystal Module on the MIR space station. The docking module will remain attached to the Krystal module to support all other Orbiter dockings as well as potential Soyuz dockings. Two sets of solar arrays, mounted externally on top of the docking module, will later be attached to MIR by Russian cosmonauts. The Shuttle/MIR docking missions have the purpose of conducting microgravity and life sciences research, as well as engineering refurbishment and resupply of the MIR complex. Speaking at the MIR-2 Docking Module Transfer to NASA will be: **J. A. (Gene) Thomas**, Deputy Director, John F. Kennedy Space Center, NASA; **John T. Conway**, Director of Payload Operations, NASA-KSC; **Valeri Grigoriev**, Department Manager, Manned Flight Programs Directorate, Russian Space Agency; **Viatcheslav Gavrilov**, Manager of Ground Operations and Docking Module Processing,

RSC Energia; **Frank Culbertson**, Phase 1 Program Deputy Director, NASA-JSC. At the conclusion of remarks, the official transfer document will be signed. [NASA/KSC News Release No: 79-95, Aug. 11, 1995.]

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RADARSAT ARRIVES AT VANDENBERG

The Canadian Space Agency's RADARSAT spacecraft, to be launched by a Delta rocket in September, arrived at Vandenberg Air Force Base this week to begin final preparations for launch. Carrying a powerful radar that can "see through" clouds and darkness, RADARSAT will produce high resolution images of the Earth's lands and oceans. Data from satellite images will be used for research and applications in oceanography, agriculture, forestry, hydrology and geology. Information on sea ice and terrestrial ice sheets will be used for climate studies and as a real-time aid for navigation of Arctic and Antarctic ocean waters, including iceberg surveillance. RADARSAT is a cooperative program among the Canadian Space Agency, NASA and NOAA. The Canadian Space Agency built and will operate the satellite; NASA will furnish the launch. In exchange, U.S. government agencies will have access to all archived RADARSAT data and have approximately 15% of the satellite's observing time. The National Oceanic and Atmospheric Administration will facilitate distribution of data to other U.S. government agencies and will make use of the data for its own environmental monitoring programs. RADARSAT International, Inc., will be the commercial distributor of RADARSAT data worldwide. Lockheed Martin has distribution rights in the United States. The Kennedy Space Center Vandenberg Resident Office is supporting the Canadian Space Agency with the facility and other ground support to prepare RADARSAT for launch. Among the activities included in prelaunch preparation are a spacecraft functional check, battery charging, leak check, fueling, and thermal blanket closeouts. It is scheduled to be taken to NASA's Space Launch Complex 2 on September 12 for mating with the McDonnell Douglas Delta II rocket which is now on the launch pad. Liftoff is currently planned for September 20. The 7,000-pound RADARSAT spacecraft will be launched by the Delta II rocket into a 500-mile high polar orbit and is designed to collect data for three years. Processed and interpreted information will be available only a few hours after RADARSAT passes over an area. The Kennedy Space Center is responsible for government oversight of the Delta II processing activities at Vandenberg Air Force Base, integration of the RADARSAT spacecraft with the launch vehicle and launch countdown activities. The Goddard Space Flight Center is responsible for the launch services contract with McDonnell Douglas. The Jet Propulsion Laboratory and NOAA will provide early on-orbit tracking support of the RADARSAT spacecraft. [NASA/KSC News Release No. 80-95, Aug. 11, 1995.]

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O-RINGS STATUS REPORT

Shuttle Managers today received their third briefing by the special assessment team that is examining the issue of an observed gas path in the Reusable Solid Rocket Motor (RSRM) nozzle internal joint number 3. The team's efforts for the past week continued

to focus on two main areas. First, the development of different Non-Destructive Evaluation (NDE) techniques for examining the insulation material known as Room Temperature Vulcanizing, or RTV, in the RSRM joints to identify any small voids which may exist. Secondly, the development of repair techniques which could be used to remove old RTV which has voids and replacing it with new RTV that is installed using a technique which prevents air voids from forming. As part of their ongoing work, the team elected to form tiger teams to assess the other RSRM nozzle joints - numbers 1, 2, 4 and 5 - to determine if any lessons learned from joint No. 3 were applicable. The teams looked at the thermal environment/thermal protection of the joints along with the performance trends seen during past RSRM operations. Joints 1, 2 and 5 have shown good performance with no adverse trends so the team has recommended no NDE or repair work to those joints. Because joint 4 has shown an increased frequency of terminated gas paths, the team has recommended that joint 4 undergo the same NDE and repair techniques being developed for joint 3. While the overall NDE technique development work shows a great deal of promise for inspecting joint areas, no viable NDE technique is currently available to screen joint 3 for gas paths. Because of this, the team has recommended that technicians perform a 360 degree excavation and repair of the RTV in joint 3. A good NDE technique has been developed for identifying RTV voids for the joint 4 area. Any repair work to joint 4 insulation would be only to the specific area identified by the NDE technique. The team's work to develop repair techniques to the RTV material has gone very well during the past week. Tests on full-scale hardware involving the removal of old RTV containing air voids and reinstallations of RTV using the modified injection/vacuum technique has produced very positive results. As part of their evaluation of the repair techniques to be used, the team examined a number of issues. Work in this area included such things as analyzing the physical properties of the materials that the repair crew will come in contact with and the environmental conditions under which the work will be performed. They also examined the clothing, tools, support equipment and work that will be done to ensure no unsafe conditions such as static electric discharge are created. There is still evaluation work to be completed and formal program approval of the RTV repair techniques to be obtained before work on **Endeavour's** hardware can begin. RTV work at Launch Complex 39A will not begin before early next week. NASA Managers plan to wait until after significant progress with the RTV issue is completed before briefing the matter to the Flight Readiness Review (FRR) panel members. The FRR panel will then determine the readiness of the hardware for flight and, if approved, set a launch date for **Endeavour** and the STS-69 mission. [RSRM O-RING STATUS REPORT, Aug. 11, 1995.]

August 14:

SHUTTLE PROCESSING UPDATES

Solid rocket booster thermal curtains and insulation have been removed at Launch Complex 39A where **Endeavour** is being readied for its STS-69 mission, now planned for late August. Pad technicians have also completed solid rocket booster nozzle environment conditioning as well. Aft main engine compartment closeouts are underway

and solid rocket booster confidence work is targeted for the night of August 16 or for August 17. In Orbiter Processing Facility Bay 3, **Columbia** is being prepared for STS-73. The main engine block No. 2 has been removed. The replacement engine, which will not have a block one liquid oxygen pump, will be installed tonight. A test of the Orbiter's flight controls was completed last night. The payload bay doors were closed for flight at 2:15 p.m. on Friday afternoon. Rollover to the Vehicle Assembly Building is targeted for August 21. [KSC SPACE SHUTTLE STATUS REPORT, Aug. 14, 1995.]

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ATLANTIS UPDATE

The MIR-2 Docking Module was transferred to NASA today now that processing by the Russians in the Space Station Processing Facility is complete. It will be placed into the payload canister on Wednesday and transported to the Operations and Checkout Building on August 17. At the O & C Building, Space Shuttle compatibility testing and other readiness checks will be performed. The docking module arrived at KSC on June 7 aboard a Russian air cargo plane. In the Orbiter Processing Facility, re-configuring **Atlantis'** payload bay and the aft flight deck for the MIR-2 docking module is proceeding. In the Vehicle Assembly Building, electrical modifications to the Orbiter Docking System are continuing. Stacking of the left solid rocket booster is scheduled to begin tonight. The STS-74 astronauts were at KSC over the weekend to participate in some of the processing activities and to conduct equipment tests. In OPF Bay 1, **Discovery's** three main engines have been removed and operations to remove and replace the No. 3 fuel cell continues. Further hypergolic deservicing is planned for overnight. [KSC SPACE SHUTTLE STATUS REPORT, Aug. 14, 1995; KSC SPACE SHUTTLE STATUS REPORT, Aug. 15, 1995.]

August 16:

STS-73: WEEK'S DELAY POSSIBLE

"Depending on how the work goes, there could be as much as a week's threat" to **Columbia's** STS-74 launch schedule, according to Kennedy Space Center spokesman **George H. Diller**. "That would be the worst case." Like **Endeavour**, **Columbia** needs to have its rocket nozzles repaired. "They think that when they add up all the work that October 26 will give them ample time, but they admit the schedule is getting tight," said Johnson Space Center spokesman **Rob Navias**. Meanwhile, **Columbia** is expected to be rolled out to Launch Complex 39B on August 28. Repairs will commence at the pad following a practice launch countdown on September 1, 1995. [Halvorson, **FLORIDA TODAY**, p. 6A, Aug. 17, 1995.]

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SHUTTLE PROGRAM BRIEFING

NASA Managers will conduct a briefing next week to industry representatives on the agency's plans to restructure the Shuttle Program. The restructuring effort will include areas such as reducing requirements, significantly reducing Civil Service involvement in

day-to-day operation of the program, modifying the government approach to safety and mission assurance and consolidating contracts into a single prime contract. The event will be held on August 21 at the Johnson Space Center (JSC) and will begin at 2:00 p.m. EDT. The briefers will be Dr. **Wayne Little**s, Associate Administrator for the Office of Space Flight, and **Bryan O'Connor**, Director, Space Shuttle, both from NASA Headquarters. Both the industry briefing and the press conference will be carried on NASA Television. [Halvorson, **FLORIDA TODAY**, Aug. 16, 1995; NASA/JSC Press Release No: N95-54, Aug. 16, 1995.]

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REPAIR PROCEDURES NEED REFINEMENT

NASA Managers and engineers have decided that another day will be necessary to finalize procedures to be used in the solid rocket booster nozzle repair and re-qualification work on **Endeavour** at Launch Complex 39A. Fresh batteries have been replaced in **Endeavour**'s Range Safety System. Aft main engine compartment closeouts are in process today while solid rocket booster repair and confidence work has been scheduled for August 18. **Endeavour**'s STS-69 mission remains scheduled for late August and will feature as prime payloads both the Wake Shield Facility-2 and the Spartan 201-203. The removal and replacement of **Columbia**'s main engine number 2 has been completed in OPF Bay 3. Leak checks of the engine are underway and the heat shields are being installed around the engine prior to rollover to the VAB. The functional test of the Inertial Measurement Unit is continuing and the vehicle's tires are being inflated to flight pressure today. The crew compartment closeouts are in work after which the crew access hatch will be closed. The weight and center of gravity determinations will be performed this weekend and the vehicle will be installed on the Orbiter transporter. Rollover of **Columbia** to the VAB is scheduled for Monday, August 21 at 9:00 a.m. Rollout to LC 39B is planned for August 28. On September 1, the STS-73 mission's terminal countdown demonstration test will be conducted. Repairs to the STS-73 solid rocket boosters will be made at the launch pad. [KSC SPACE SHUTTLE STATUS REPORT, Aug. 16, 1995; Halvorson, **FLORIDA TODAY**, Aug. 17, 1995.]

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STS-74 PREPARATIONS CONTINUE IN OPF BAY 2

The remote manipulator arm is being installed in **Atlantis** today. Midbody closeouts are also in work. The functional test of the orbital maneuvering system and the auxiliary power units continue. Reaction control testing is scheduled to begin next week. In the Vehicle Assembly Building, electrical testing of the Orbiter Docking System is commencing today. Stacking of the left aft center solid rocket booster segment was completed yesterday and the left forward center segment is being stacked today. Repairs to the STS-74 solid rocket booster nozzle joints will be made at the launch pad. In the Space Station Processing Facility, the Russian Mir-2 Docking Module is being installed into the payload canister today in preparation for transportation to the Operations and Checkout Building tomorrow. Work continues, meanwhile, to de-configure and de-

-service **Discovery** in preparation for its ferry flight to Palmdale, CA, which is planned to begin on or about October 1. [KSC SPACE SHUTTLE STATUS REPORT, Aug. 16, 1995.]

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MIDRANGE PROCUREMENTS ON INTERNET

NASA is leading the Federal Government in providing procurement information to industry over the Internet, and on October 1, 1995, the Internet will be the only source of most NASA synopses and solicitations for business opportunities. For the past two years, NASA has been testing a procurement approach, called MidRange, designed to benefit both the Agency and its industry partners by providing a less costly, more expeditious contracting process, said **Deidre Lee**, Associate Administrator for Procurement. To further enhance and expedite the process, NASA will use the Internet to provide MidRange synopses rather than publishing them in the Commerce Business Daily (CBD). The two major advantages to this approach are that industry will have immediate access to solicitations and can begin preparing a proposal, and the 45-day waiting period between the issuance of a synopsis and the receipt of proposals will be waived. Effective October 1, 1995, synopses for MidRange procurements valued at less than \$500,000 with options up to a total of \$2.5 million will be available only on the Internet. NASA procurement information is available on the NASA Procurement Office home page on the World Wide Web, connecting to all of the NASA Center procurement home pages, as well as providing other information about NASA's procurement process. Other Federal procurement information, including NASA, can be obtained from the Federal Acquisition Jumpstation. The URL for the NASA Procurement home page is: <http://www.hq.nasa.gov/office/procurement>. The URL for the Federal Acquisition Jumpstation is: <http://procure.msfc.nasa.gov/fedproc/home.html>. [INTERNET ADVISORY: I95-11, Aug. 16, 1995.]

August 17:

SHUTTLE STATUS REPORT

Technicians at Launch Complex 39A have reinstalled **Endeavour's** solid rocket booster thermal curtains. Aft main engine compartment closeouts are proceeding and SRB repair and confidence work will commence tomorrow. In OPF Bay 3, **Columbia's** tires will be inflated to flight pressure today. Heat shield installation around main engine No. 2 also continues. Orbiter power-down in preparation for rollover is planned to occur today. The weight and center of gravity determination is scheduled to begin tonight. Tile water proofing and installation of **Columbia** upon the Orbiter transporter will occur this weekend. Rollover of **Columbia** is currently targeted for Monday, August 21, at 9:00 a.m. Rollout to Launch Complex 39B is scheduled for August 28. The Terminal Countdown Demonstration Test is tentatively planned for a T-0 at 11:00 a.m. on September 1. Repairs to the STS-73 solid rocket boosters will be made at LC 39B. The remote manipulator arm installation into **Atlantis** is complete. Meanwhile, in OPF Bay 2, mid-body closeouts are continuing. The functional test of the orbital maneuvering system and the auxiliary power units continue. Reaction control system testing is

scheduled to begin next week. In the Vehicle Assembly Building, mechanical testing of the Orbiter Docking System is scheduled to begin on August 18. Stacking of the left forward center solid rocket booster segment is now scheduled for tonight. Repairs to the STS-74 solid rocket booster nozzle joints will also be made at the launch pad. The Russian Mir-2 Docking Module is being transported from the Space Station Processing Facility to the Operations and Checkout Building today. It will be installed into the electrical test stand tomorrow. Finally, work continues to de-configure and de-service **Discovery** in preparation for the ferry flight to Palmdale which is planned to begin on or about October 1. [KSC SPACE SHUTTLE STATUS REPORT, Aug. 17, 1995.]

August 18:

SHUTTLE UPDATES

The procedure to be used in the repair of the solid rocket booster O-Rings has been designed and approved. Technicians at Launch Complex 39A are currently removing the solid rocket booster nozzle plug from **Endeavour's** suspect booster. Solid rocket booster RTV excavation will commence tomorrow. In OPF Bay 3, **Columbia's** startracker door is being reinstalled today and the Orbiter is being jacked down in preparation for the weight and center of gravity determination which is scheduled for tonight. Tile waterproofing and installation of **Columbia** onto the Orbiter transporter will occur this weekend. Rollover of **Columbia** to the VAB is scheduled for Monday, August 21, at 9:00 a.m. Rollout to Launch Complex 39B is scheduled for August 28. The terminal countdown demonstration test for the mission is tentatively planned for a T-0 a 11:00 a.m. on September 1. The Space Shuttle **Atlantis** is in OPF Bay 2 where ammonia boiler servicing was performed last night. Mid-body closeouts are continuing. The functional test of the orbital maneuvering system has been completed. Reaction control system testing is scheduled to begin next week. Preparations are beginning for the installation of the tunnel adapter. In the Vehicle Assembly Building, mechanical testing of the Orbiter Docking System is being performed today. Stacking of the left forward center solid rocket booster segment is complete. Preparations to hoist the right booster aft segment onto the mobile launcher platform will begin tonight with the arrival of the segment in the VAB. In the Operations and Checkout Building, the Russian Mir-2 Docking Module is being hoisted from the payload canister into a test stand to begin approximately three weeks of electrical testing. Meanwhile, work continues to deconfigure and deservice the Space Shuttle **Discovery** in preparation for the ferry flight to Palmdale, CA, on October 1 for the Orbiter's OMDP. [KSC SPACE SHUTTLE STATUS REPORT, Aug. 18, 1995.]

August 21:

SHUTTLE TAKEOVER 2-3 YEARS AWAY

Takeover of the Space Shuttle Program from NASA by a single private contractor is going to take two to three years, according to Associate Administrator **J. Wayne Little** who spoke to industry leaders recently. "We have to move very carefully to a new structure and a little bit different way of doing business," he said to a Houston briefing for industries interested in running the Shuttle Program. Former JSC Director

Christopher Kraft said, "Hopefully, their apparent tardiness can be converted into a little more speed when they get more confidence in what they are doing." Kraft also said that NASA may be "conservative in giving up duties until the agency sees how the prime contractor performs." Shuttle Management Director at Kennedy Space Center said, "Longer is better because of the magnitude of this change. You want to pull out in a very cautious manner." Sieck was formerly Launch Director at KSC. [Borenstein, THE ORLANDO SENTINEL Aug. 21, 1995; Halvorson, FLORIDA TODAY, pp. 1A & 5A, Aug. 19, 1995; Halvorson, FLORIDA TODAY, Aug. 22, 1995; Borenstein, THE ORLANDO SENTINEL, pp. A-1 & A-7, Aug. 22, 1995.]

August 22:

STS-69: NEW ENGINE PUMP INSPECTIONS

Otto Goetz, Deputy Project Manager for the Space Shuttle Main Engine, plans to conduct the first inspection of the new high pressure liquid oxidizer turbopump at the Kennedy Space Center in Florida. The pump, built by Pratt and Whitney and incorporated into the Rocketdyne-built main engine, saw its first flight on July 13 on Space Shuttle mission STS-70. The pump is incorporated into a new configuration main engine known as the Block I engine. Along with the new pump, the Block I engine has a new two-duct powerhead and a single-coil heat exchanger. The Block I improvements increase the safety margins and reliability of the Shuttle main engines which provide the second stage of propulsion in Space Shuttle flights. [NASA/KSC News Release No. 83-95, Aug. 22, 1995.]

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STS-69: LAUNCH REMAINS ON HOLD

Endeavour's launch remains on indefinite hold until repairs to the solid rocket booster nozzle O-Ring seals are completed. The nozzle plugs have been removed and today work is centered on vacuum back-fill operations around the seals. Once this is complete, a 24-hour cure period is scheduled before final cleaning and inspections begin tomorrow. Repairs to SRB nozzles are planned for today. Ordnance installation and hypergolic fuel pressurization have been scheduled along with crew arrival and the launch countdown. The launch date is tentatively projected as being late-August. The mission will last just under 11 days and will feature deployment and use of the Wake Shield Facility-2 and Spartan 201-203 payloads. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Aug. 22, 1995.]

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SHUTTLE FLEET UPDATES

The Space Shuttle **Columbia** has been rolled over the Vehicle Assembly Building for mating with its STS-73 mission solid rocket boosters and external tank. First motion for the rollover occurred at about 10:30 a.m. Mating operations were begun on arrival and the Shuttle Interface Test was set for August 24. Preparations are underway to install the tunnel adapter in **Atlantis** for its upcoming STS-74 docking mission with the Russian Mir Space Station. Payload pre-mate operations and checkouts of the remote manipulator

system are currently in process. STS-74 key operational milestones: installation of the forward reaction control system, the Space Shuttle main engines and the Orbiter Docking System. In OPF Bay 1, **Discovery's** forward reaction control system will be removed tomorrow. On August 30, the vehicle's right hand orbital maneuvering system pod will be removed in preparation for **Discovery's** ferry flight to California and an OMDP. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Aug. 22, 1995.]

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WELDON CONCERNED ABOUT SHUTTLE CHANGES

Congressman **Dave Weldon** (R-Palm Bay, FL) said the details of the transfer of responsibility for the Shuttle program from NASA to a private contractor disturb him: "I believe the contractors can do it, but the public is going to demand a certain level of accountability that can only be delivered by NASA. We need to make sure we're not going to compromise safety, and I want to find out if the budget constraints that are being placed on NASA are consistent with the mission requirements. I believe very strongly that if another Shuttle blows up, then the construction of an international space station and our whole manned space program could be set back 10-15 years." [Banke, **FLORIDA TODAY**, Aug. 23, 1995.]

August 24:

MANAGERS TO BRIEF NEXT MISSION

Shuttle Managers will hold a press briefing at approximately 3:30 p.m. EDT Friday to discuss plans for launch of STS-69 following a Flight Readiness Review (FRR) being conducted to examine the status of the next Space Shuttle Mission. Managers will examine all open issues which have been worked in the Shuttle Program since the formal FRR meeting for STS-69 was held on July 18, including the investigation into erosion seen on Space Shuttle solid rocket booster nozzle O-Rings during the last two flights. The FRR, scheduled to begin at 1:00 p.m. EDT, is expected to last approximately two hours. The briefing, with **Tommy Holloway**, Manager, Space Shuttle Program and **Ron Ditemore**, Manager, Space Shuttle Program Integration Office, will originate from the Johnson Space Center. NASA newsrooms at Headquarters, Washington, D. C., KSC, MSFC and JSC will be open to support the briefing. [NASA/KSC Note to Editors: N95-55, Aug. 24, 1995; Borenstein, **THE ORLANDO SENTINEL**, p. A-11, Aug. 25, 1995; Banke, **FLORIDA TODAY**, Aug. 24, 1995.]

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STS-69 UPDATE

Work to install the nozzle plugs on the **Endeavour's** solid rocket boosters was delayed due to high winds associated with Tropical Storm Jerry. Work is scheduled to begin later today as the storm continues to drift to the northwest. Once the plugs are installed a 24-hour cure period will begin. A delta flight readiness review for STS-69 is scheduled for 1:00 p.m. August 25, to discuss the success of the booster operations and to determine a firm launch date. In addition to the solid rocket booster repairs at Launch Complex 39A, launch countdown preparations are underway as are aft engine

compartment closeouts. Ordnance installation and hypergolic fuel pressurization commence August 26 and the vehicle's payload bay doors will be closed the next day, Sunday. Crew arrival is expected at Kennedy Space Center on August 28 at 12:30 p.m. Start time for the countdown has yet to be determined. Technicians in the Vehicle Assembly Building are conducting a Shuttle interface verification test on **Columbia** as they prepare the eldest Shuttle for rollout to Launch Complex 39B at 2:00 a.m. August 28. Meanwhile, **Atlantis** remains in OPF Bay 2 where it is being readied for its second Mir docking mission, STS-74. Today, efforts are underway to remove and replace three thrusters on the right hand orbital maneuvering system pod. The bay will be cleared for about 48 hours for this hazardous operation. In the Operations and Checkout Building high bay, engineers are conducting an interface verification test dry-run on the Russian Mir-2 Docking Module. Key operational milestone targets are: installation of the Space Shuttle main engines on August 28-29; installation of the forward reaction control system on August 29; installation of the Orbiter Docking System on August 30 and installation of the Russian Mir-2 Docking Module on September 7. Finally, **Discovery** continues to undergo processing efforts for its ferry flight to California in October. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Aug. 24, 1995.]

August 26:

STS-69: LAUNCH DATE IS AUG. 31

NASA Managers today set Thursday, August 31, 1995, as the official launch date for Space Shuttle **Endeavour** on Mission STS-69. Major events planned for the flight include deployment and retrieval of two free-flying payloads and a six-hour spacewalk to evaluate assembly techniques for the International Space Station. The launch date decision came after NASA officials held a Flight Readiness Review to consider remaining issues in preparing **Endeavour** for the flight. Among the items reviewed and closed out was the issue of minor O-Ring erosion seen in a joint of the Reusable Solid Rocket Motor (RSRM) nozzle during the last two Shuttle launches. "In late July we decided to delay **Endeavour's** launch," said Space Shuttle Director **Bryan O'Connor**. "I believe that was the right thing to do so that we could better understand the anomaly seen with the RSRM nozzle joints. Over the last four weeks, this issue has been worked by NASA Shuttle, safety, and independent assessment teams. All parties involved in this effort agree that we now understand what was causing the anomaly and that proper procedures have been established to resolve this issue. The process we've gone through demonstrates once again that flying safely remains our number one priority in the Shuttle program." Launch of **Endeavour** is set for 11:04 a.m. EDT at the opening of a 2 1/2 hour launch window. The planned mission duration is 11 days. The mission is scheduled to conclude with a landing at Kennedy Space Center's Shuttle Landing Facility on September 11 at approximately 7:30 a.m. EDT. [Note to Editors: 95-56, Aug. 25, 1995; Borenstein, **THE ORLANDO SENTINEL**, Aug. 26, 1995.]

August 26: SNOOPYS AWARDED TO CONTRACT EMPLOYEES

Astronaut **Steve Smith** has awarded Silver Snoopys to USBI's **Mary Chambers**. Meanwhile Mission Specialist **Joe Tanner** awarded a Snoopy to Avionics Control and Software's **Herb Gruber**. McDonnell Douglas employees **Paul Waligora** and **Darcy Drew** were presented their Snoopys by astronauts **Bill McArthur** and **Marsha Ivins**, respectively. Ivins also awarded a Snoopy to **Renee Smith**, also of McDonnell Douglas. ["Astronauts Award Silver Snoopys to USBI, McDonnell Douglas Workers," **FLORIDA TODAY**, Aug. 27, 1995.]

August 28: STS-69: COUNTDOWN BEGINS

The countdown for launch of STS-69 is set to begin today at 3:00 p.m. EDT for a 2 1/2 hour launch window opening at 11:04 a.m. on Thursday, August 31. Repairs to the solid rocket boosters, ordnance installation and aft engine compartment closeouts were completed over the weekend. The STS-69 crew arrived today at 11:50 a.m. at the SLF. The Orbiter's payload bay doors will be closed for flight tonight. **Endeavour** is scheduled to land at Kennedy Space Center's Shuttle Landing Facility on September 11. Today, pad technicians will also begin final vehicle and facility closeouts for launch and stow flight crew equipment. **Endeavour** will deploy the Wake Shield Facility-2 and Spartan 201-203 during its time in orbit. The crew includes Commander **David Walker**, Pilot **Kenneth D. Cockrell** and Mission Specialists: **James Voss**, **James Newman** and **Michael Gernhardt**. [Borenstein, **THE ORLANDO SENTINEL**, Aug. 29, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Aug. 28, 1995.]

0 **NASA MANAGERS WATCH WEATHER**

Tropical Storm Iris, now in the Atlantic, is being watched closely by NASA Managers and the countdown for **Endeavour's** STS-69 launch begins. "We'll look at the weather situation as we always do, but you won't know what you will get until you get there," said KSC Press Spokesman **Bruce Buckingham**. NASA forecasters are presently convinced that it is "too early to tell whether Iris or any of the other tropical disturbances in the Atlantic Ocean will affect their launch plans." [Banke, **FLORIDA TODAY**, Aug. 27, 1995; Banke, **FLORIDA TODAY**, p. 1A, Aug. 28, 1995.]

0 **ATLAS LAUNCHES JAPANESE SATELLITE**

"That's eight missions in eight months from the Cape, which is a pretty good record," said Lockheed Martin company spokesman **Larry Foss** about the launch this evening of a Lockheed Martin Atlas rocket. The vehicle took a Japanese communications satellite into geosynchronous orbit some 23,000 miles above Earth. The satellite was built for Japan's for the Tokyo company: Japan Satellite Systems Inc. by Hughes Space and Communications Co. The satellite will provide voice, data and television signals to customers in Asia, Australia, New Zealand and India. [Halvorson, **FLORIDA TODAY**,

p. 1A, Aug. 29, 1995; Borenstein, THE ORLANDO SENTINEL, Aug. 28, 1995; Borenstein, THE ORLANDO SENTINEL, Aug. 29, 1995.]

August 29:

STS-69: COUNTDOWN COMMENCES

The countdown for launch of **Endeavour's** STS-69 mission began at 3:00 p.m. yesterday for a 2 1/2-hour launch window opening at 11:04 a.m. on Thursday, August 31. **Endeavour** is scheduled to land at Kennedy Space Center's Shuttle Landing Facility at 7:33 a.m. September 11. Early this afternoon, Pad 39A will be cleared for loading the onboard cryogenic tanks with the liquid hydrogen and liquid oxygen reactants. Reactant loading is expected to be finished at about 6:00 p.m. The reactants will provide electricity for the Orbiter and crew while in space and drinking water as a by-product during their 11-day mission. After the cryogenics are loaded, the Orbiter's mid-body umbilical unit will be demated and retracted into the fixed service structure. Final vehicle and facility closeouts will also resume. Final mid-deck payload loading operations will finish tomorrow. On Wednesday, preparations will be made to retract the rotating service structure to launch position at about 2:30 p.m., pending weather. Loading of the external tank with cryogenic propellants is scheduled to begin at about 2:44 a.m. Thursday. Air Force weather forecasters are currently indicating a 40 percent probability of weather prohibiting launch on Thursday. The primary concerns are for possible showers and thunderstorms associated with remnants of Tropical Storm Jerry which may drift south over central Florida. During Thursday's launch window, the winds at Pad A are expected to be from the east at 10-16 knots; temperature 82 degrees F; visibility 7 miles; humidity 77 percent; and clouds scattered at 3,000, 8,000 and 30,000 feet. The 24-hour-delay forecast reveals slightly better conditions and a 30 percent chance of violation. The five-member astronaut crew arrived at KSC's Shuttle Landing Facility yesterday at about 11:50 a.m. Today they will be involved with checking out their mission plans and fit checks of their equipment. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Aug. 29, 1995.]

August 30:

STS-69: WEATHER MAY DELAY LAUNCH

The countdown for launch of **Endeavour** continues on schedule today. The 2 1/2-hour launch window opens at 11:04 a.m. Thursday, August 31. Completing an 11-day mission, **Endeavour** is scheduled to land at 7:33 a.m. September 11 at Kennedy Space Center. No technical issues are being worked by the Shuttle Mission Management Team today and no problems are being reported from the pad. Overnight, technicians replaced a helium regulator in the left aft engine compartment and re-checked ordnance connectors on the left hand solid rocket booster. Today, workers are in the process of activating the Orbiter's inertial measurement units and making preparations to retract the rotating service structure from the vehicle later this afternoon. This move could be delayed several hours without impacting the overall schedule if weather threatens the area. Loading of the external tank with cryogenic propellants is scheduled to begin at about 2:44 a.m. tomorrow but could begin up to a half hour earlier if the vehicle is

ready. Air Force weather forecasters are now indicating a 60 percent probability of weather prohibiting launch on Thursday. The primary concerns are for possible showers and thunderstorms associated with remnants of Tropical Storm Jerry which is drifting south over central Florida. During Thursday's launch window, the winds at Pad A are expected to be from the east northeast at 12-18 knots; temperature 82 degrees F; visibility 7 miles; humidity 77 percent; and clouds scattered at 2,500, 10,000 and 25,000 feet. The 24-hour-delay forecast reveals slight better conditions and a 30 percent chance of violation. Also, there is a 10 percent chance of lightning violating tanking constraints early Thursday morning. Today, the five-member astronaut crew will be briefed on tomorrow's launch weather outlook at KSC and the TAL sites in Spain and Africa. Also today, the crew will receive a final mission briefing and make last minute adjustments to their flight plans while completing their review of launch day activities. ["Weather Threatens **Endeavour** Launch," Aug. 30, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Aug. 30, 1995.]

August 31:

STS-69: SCRUBBED

Launch of the Space Shuttle **Endeavour** was postponed today due to the failure of one of three fuel cells aboard the Orbiter. The failed fuel cell was indicating higher than allowable temperatures during normal activation this morning. The scrub was called at about 3:30 a.m. today, prior to commencing tanking operations. Fuel cells provide electricity to the Orbiter while in space. They combine liquid hydrogen and liquid oxygen to produce electrical power for the Orbiter's electronics and payloads. The byproduct of this reaction is drinking water for the crew. All three cells are required to be operational prior to launch. Due to the failure of fuel cell no. 2, managers determined the unit must be removed and replaced. Based on the scheduled time necessary to perform this work, managers have set September 7 as the next launch date for mission STS-69. The 2 1/2-hour launch window opens at 11:09 a.m. Completing an 11-day mission, **Endeavour** is scheduled to land at 7:38 a.m. September 18 at Kennedy Space Center. The five-member astronaut crew will return to their homes in Houston, TX, at 1:00 p.m. today. Their date of return back to KSC will be determined this weekend. Work during the next few days will entail draining the fuel cell cryogenic storage tanks (today) and opening the payload bay doors (Friday) to gain access to the fuel cell located under the payload bay lining. Once the cell is replaced it will be retested and the payload bay doors closed for flight (Sunday). No work is scheduled for the Labor Day Holiday on Monday. The countdown is scheduled to begin again at 12:01 a.m. Tuesday. [Halvorson, **FLORIDA TODAY**, p. 8A, Aug. 31, 1995; Borenstein, **THE ORLANDO SENTINEL**, Aug. 31, 1995; NASA/KSC Press Release, Aug. 31, 1995.]

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WALKER SCRUB STATEMENT

"We appreciate the launch team's excellent work. Delays of this type are just a part of the business, and they just go to show that the system of checkouts that always precede a launch is a necessary part of space flight. We're confident the KSC team will have

Endeavour ready to fly in short order. We've been ready, and we plan to be back next week." [Walker Statement, Aug. 31, 1995; Halvorson, FLORIDA TODAY, pp. 1A-2A, Sept. 1, 1995; Borenstein, THE ORLANDO SENTINEL, p. A1, Sept. 1, 1995.]

SEPTEMBER

September 1:

STS-69: ISSUES & CONCERNS

A decision has been made to begin the STS-69 countdown eight hours earlier than initially planned to reduce the compression of countdown activities. The vehicle will be powered on at T-43 hours and the clock will start an hour later at 4 p.m. on Monday, September 4 at the T-42 hour mark. Cryogenic reactants have been offloaded and the payload doors have been opened; the payload bay liners have been removed. Work is currently under way to remove and replace fuel cell No. 2. The replacement fuel cell will be retested September 2 followed by fuel cell and payload bay closeouts. Payload bay doors will be closed September 3. The STS-69 crew will arrive at Kennedy Space Center's Shuttle Landing Facility on September 5 at 4:30 p.m. [KSC SPACE SHUTTLE STATUS REPORT, Sept. 1, 1995.]

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SHUTTLE FLEET UPDATE

Columbia/OV-102, STS-73: The confidence repair to **Columbia**'s solid rocket boosters at Launch Complex 39B is on schedule. Removal of the RTV thermal putty from the left booster is in work today and will be finished tonight. Removal of RTV from the right booster is complete. Backfilling with new material will begin on Saturday. The repair work is scheduled to be completed with the nozzle plugs installed next Wednesday.

Atlantis/OV-104, STS-74: Main engine installation is in work; main engines No. 1 and No. 3 have been installed and No. 2 is proceeding today. Mid-body closeouts are continuing. The interface verification test of the forward reaction control system is continuing. In the Vehicle Assembly Building, stacking of the right solid rocket booster is in work. Closeouts of the Orbiter docking system are underway. It will be transferred to the Orbiter Processing Facility on Tuesday. In the Operations and Checkout Building, the Cargo Integration Test Equipment (CITE) testing to the Russian MIR-2 Docking Module has been completed. Preparations are underway for installing the module into the payload canister on September 7. It will be moved to the Orbiter Processing Facility and installed into the payload bay of **Atlantis** on September 11.

Discovery/OV-103: Work continues to deconfigure and deservice **Discovery** in preparation for the ferry flight to Palmdale, CA. **Discovery** will be towed to the Shuttle Landing Facility on September 25 for mating to the 747 Shuttle Carrier Aircraft. The ferry flight is scheduled to begin on September 26. [KSC SPACE SHUTTLE STATUS REPORT, Sept. 1, 1995.]

EXPENDABLE VEHICLES

A decision has been made to reschedule the launch of RADARSAT to no earlier than October 4 as recommendations of the Delta/Koreasat failure review board are pending. The launch time will remain the same at 7:22 a.m. PDT. With the exception of fueling the satellite, processing has been completed on RADARSAT, which is in a spacecraft clean room at Vandenberg Air Force Base. Based on this new date, the spacecraft is scheduled to be mated to the Delta rocket at Space Launch Complex 2 on September 2. A launch crew certification, including a full countdown dress rehearsal, is being performed today. A RADARSAT mission science briefing from NASA headquarters, Washington, D.C., will be presented on NASA Television on Wednesday, September 6, starting at 1:30 p.m. EDT. A decision has also been made to reschedule the launch of XTE to no earlier than October 25 as recommendations from the Delta/Koreasat review board are pending. Processing of XTE in Spacecraft Hangar AO was completed with the mating to the payload attach fitting on August 21. Other milestones that have been recently achieved include: completion of a spacecraft performance test; installation of the spacecraft batteries; a spacecraft launch simulation; and completion of a mission simulation covering the early hours of flight after separation from the Delta. Upcoming milestones include: a partial tanking of liquid oxygen on the first stage to test for cryogenic leaks on September 11, a Simulated Flight Test of the vehicle to check the in-flight functions of the Delta after T-0 on September 12 and 13, and a pair of launch crew certifications, which includes a launch countdown and full tanking of the vehicle with liquid oxygen on September 14 and October 16. XTE will be transported from Hangar AO to Launch Pad 17A on October 10 to be mated to the Delta rocket. [EXPENDABLE VEHICLE STATUS REPORT, Sept. 1, 1995.]

September 2:

SUBCONTRACTOR WORKERS HONORED

NASA has honored eight EGP workers for teamwork in support of the Space Shuttle Program. EGP [an EG&G Florida, Inc. subcontractor] conducted surveys to determine customer satisfaction levels, quality and equipment dependability. The individual workers honored were **Richard Bergen, Kenneth Dold, Donald Ewing, Jr., James Hofma, James Pangborn, Michael Paulus, Jeffrey Randolph** and **Mark Scott**. [NASA Recognizes EG&G Subcontractors' Teamwork," FLORIDA TODAY, Sept. 3, 1995.]

September 5:

STS-69: COUNTDOWN BEGINS, AGAIN

At this time it is undetermined what effect, if any, Hurricane Luis will have on Kennedy Space Center. A contingency rollback plan is being developed. The Mission Management Team will make a decision on what parts of the rollback plan should be implemented at 8:00 a.m. on Wednesday. In the meantime, technicians at Launch Complex 39A continue to prepare **Endeavour** for its STS-69 mission set to launch now at 11:09 a.m., September 7. Fuel cell no. 2 has been removed, replaced and successfully retested. The payload bay doors of **Endeavour** have been closed and the countdown

began at 4:30 p.m. yesterday. Today, pad techs will load cryogenic reactants, power-on fuel cell no. 2 for an extended test-run and remove and replace a Data Display Unit tonight. The astronauts are expected to arrive at Kennedy Space Center this afternoon at 4:30 p.m. Mid-deck payloads will be installed at 2:00 p.m. Wednesday; a half-hour later the rotating service structure will be retracted. Tanking is set to begin at 2:20 a.m. September 7. [Banke, **FLORIDA TODAY**, Sept. 4, 1995; Banke, **FLORIDA TODAY**, Sept. 5, 1995; Halvorson, **FLORIDA TODAY**, Sept. 6, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Sept. 5, 1995.]

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SHUTTLE FLEET UPDATE

The RTV backfilling for both solid rocket boosters of Space Shuttle **Columbia** is underway and on schedule. The nozzle repair activity is expected to be completed by midnight tomorrow. The Space Shuttle **Atlantis**, now in OPF Bay 2, is now completely outfitted with its main engines. In the Vehicle Assembly Building, stacking of the right forward assembly is underway today. Closeouts of the Orbiter Docking System are underway in preparation for transporting it to the Orbiter Processing Facility tomorrow and installing it into the payload bay of **Atlantis** on Friday. In the Operations and Checkout Building, closeouts of the Russian Mir-2 Docking Module are underway in preparation for installing it into the payload canister on Thursday. It will be moved to the Orbiter Processing Facility and installed into the payload bay of **Atlantis** on September 11. Work continues to deconfigure and deservice **Discovery** [OV-103] in preparation for its ferry flight to Palmdale, CA. **Discovery** will be towed to the Shuttle Landing Facility on September 25 for mating to the 747 Shuttle Carrier Aircraft. The ferry flight is scheduled to begin on September 26. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Sept. 5, 1995.]

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STS-69 LAUNCH WEATHER FORECAST

On Thursday, September 7, an upper level low pressure trough is forecast to be over northern Florida and a weak front is expected over central Florida. These will combine to create atmospheric instability with cloudiness and a chance for rain. There is a chance of showers or thunderstorms along with low ceilings/thick layered clouds/anvil clouds. The probability of a tanking violation is 10%; the probability of a launch criteria violation is 60%. [**STS-69 LAUNCH WEATHER FORECAST**, Sept. 5, 1995; **STS-69 LAUNCH WEATHER FORECAST**, Sept. 6, 1995.]

September 6:

STS-69: 60% UNFAVORABLE WEATHER

The countdown for launch of **Endeavour** continues on schedule today. The 2 1/2-hour launch window opens at 11:09 a.m. Thursday, September 7. Completing an 11-day mission, **Endeavour** is scheduled to land at 7:38 a.m. September 18 at Kennedy Space Center. Fuel cell no. 2 that was replaced over the weekend has been retested and is working properly. No further technical issues are being worked by the Shuttle Mission

Management Team and no problems are being reported from the pad. Overnight, discussions were held to possibly delay deployment of the solid rocket booster recovery ships due to high sea states. At today's mission management team meeting, it was decided the ships should be deployed on schedule. They departed Hangar AF at about 11 a.m. today. Today, workers are in the process of activating the Orbiter's inertial measurement units and making preparations to retract the rotating service structure from the vehicle later this afternoon. This move could be delayed by several hours without impacting the overall schedule if weather threatens the area. Loading of the external tank with cryogenic propellants is scheduled to begin at about 2:49 a.m. tomorrow but could begin up to a half-hour earlier if the vehicle is ready. Air Force weather forecasters are now indicating a **60** percent probability of weather prohibiting launch on Thursday. The primary concerns are for showers and thunderstorms. During Thursday's launch window, the winds at Pad A are expected to be from the northeast at 7-10 knots; temperatures 83 degrees F; visibility 7 miles; humidity 77 percent; and clouds scattered at 2,500 and 10,000 and broken at 25,000 feet. The 24-hour-delay forecast reveals slightly better conditions and a **40** percent chance of violation. Also, there is a **10** percent chance of lightning violating tanking constraints early Thursday morning. Today, the five-member astronaut crew will be briefed on tomorrow's launch weather outlook at KSC and the TAL sites in Spain and Africa. Also today, the crew will receive a final mission briefing and make last minute adjustments to their flight plans while completing their review of launch day activities. The STS-69 crew includes Commander **David M. Walker**, Pilot **Kenneth D. Cockrell** and Mission Specialists: **James S. Voss**, **James H. Newman** and **Michael L. Gernhardt**. [Halvorson, **FLORIDA TODAY**, Sept. 7, 1995; Borenstein, **THE ORLANDO SENTINEL**, Sept. 7, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Sept. 6, 1995.]

September 7:

ENDEAVOUR LIFTS OFF

The winds shifted keeping storm clouds at bay and **Endeavour** managed a launch at 11:09 a.m. "We were kind of sitting in just the correct place to launch from the Kennedy Space Center. And it worked out just fine," said **Loren Shriver**, head of the Shuttle Mission-Management Team. He added that it was an "absolutely successful launch. It sort of gets the show back on the road." A number of minor glitches with the vehicle itself cropped up with an hour to go before launch, but they were fixed or found to be of no concern, according to Shriver. [Borenstein, **THE ORLANDO SENTINEL**, pp. A-1 & A-4, Sept. 8, 1995; Moyer, **FLORIDA TODAY**, Sept. 8, 1995.]

September 11:

STS-73: PROCESSING UPDATE

Solid rocket booster nozzle repair and confidence work has been completed on **Columbia** which is harddown at Launch Complex 39B; it is awaiting launch on the STS-73 mission scheduled presently for September 28. The mission duration is planned for 15 days and 22 hours. Today pad technicians will conduct the STS-73 terminal countdown demonstration test; undertake the mission's helium signature leak test and make

preparations for storable propellant loading operations. The KSC launch readiness review will also begin today. The TCDT is scheduled to conclude tomorrow at 11:00 a.m. Hypergolic propellant loading activities will commence September 13-14 and an APU hot firing will occur September 15. Next week technicians will charge the USML batteries and make experiment fit checks. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Sept. 11, 1995.]

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STS-74: RUSSIAN DOCKING MODULE

Today the Russian Mir-2 Docking Module is being transported from the Operations and checkout Building to OPF Bay 2 and will be installed into the payload bay of **Atlantis** late this afternoon. The interface verification test (IVT) to verify the mechanical and electrical connections is scheduled for Monday and Tuesday next week. The Orbiter docking system (ODS) was installed into the payload bay over the weekend and electrical connections are being made today. The heat shields are being installed around the three main engines. In the Vehicle Assembly Building, the external tank is being mated to the solid rocket boosters today. For schedule reasons, a decision has been made to repair the STS-74 solid rocket booster nozzles in the VAB instead of at the launch pad. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Sept. 11, 1995.]

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SRB POST-LAUNCH WORK

At NASA Hangar AF on Cape Canaveral Air Station, removal of the solid rocket booster nozzles will be completed today. They will be shipped to Thiokol in Utah on Tuesday to begin inspections of the nozzle joint O-Ring seals. The disassembly and analysis will take approximately two weeks. Meanwhile, work continues to deconfigure and deservice **Discovery** in preparation for its ferry flight to Palmdale, CA. **Discovery** will be towed to the Shuttle Landing Facility on September 25 for mating to the 747 Shuttle Carrier Aircraft. The ferry flight is scheduled to commence on September 26. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Sept. 11, 1995; KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Sept. 12, 1995.]

September 12:

HELIUM BALLOON TEST

A leak check test of the world's largest helium balloon will be performed on a cost-reimbursable basis in the Vehicle Assembly Building at Kennedy Space Center on September 15-17. The balloon's pilot, Capt. **Hank Brink** of The Netherlands, hopes to complete the first non-stop flight around the world in a balloon, and requested NASA's help in preparing for his history-making trip. The VAB is the only building believed to be large enough to accommodate an indoor leak check on a balloon that is 200 feet (61 meters) tall when fully inflated. Testing of the helium balloon will be under way on September 16. NASA Test Director **Pete Nickolenko** and **Joe Porta**, lead for Handling and Umbilical in the Mechanical Engineering Directorate will brief the press

on NASA's support for the project. The balloon is to arrive at the space center on today after being flown into Miami from The Netherlands and offloaded onto a truck for transport. Brink and a support team will be on hand to conduct the inflation and leak check of the balloon, scheduled to begin September 15 and conclude September 17. For the purposes of the leak check, the balloon will only be partially inflated to assure the proper clearances between the balloon and the VAB transfer aisle. [NASA/KSC News Release No. 88-95, Sept. 12, 1995.]

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STS-69: FUEL CELL ANOMALY

At NASA Hangar AF on Cape Canaveral Air Station, the solid rocket booster nozzles were shipped to Thiokol this morning at 5:30 a.m. where detailed inspections will be performed. At Hangar AF, initial inspections of the case to nozzle joints did not reveal anything of concern. Disassembly of the remaining solid rocket segments begins today. Malfunction analysis of **Endeavour's** No. 2 fuel cell has been completed and did not reveal the source of the problem which caused the cell to be removed and replaced. Because the replaced fuel cell on orbit is functioning normally, a cooling system problem on the Orbiter is unlikely. Engineers are looking into other possibilities which might have caused the problem. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Sept. 12, 1995.]

September 13:

PROCESSING OF COLUMBIA FOR STS-73

Endeavour is scheduled to complete its STS-69 mission September 18 with a 7:38 a.m. landing on the Shuttle Landing Facility runway, weather permitting. Meanwhile, technicians at Launch Complex 39B have completed the STS-73 terminal countdown demonstration test and the mission's helium signature leak test. Solid rocket booster nozzle repair and confidence work has also been completed. Today the techs will conduct hypergolic storable propellant loading operations through September 14. The mission's flight readiness review will be conducted September 14, followed by an auxiliary power unit hot firing the next day and USML battery charging and experiment fit checks next week. In OPF Bay 2, **Atlantis** undergoes a landing gear functional check today. A changeout has been performed of one of the mass memory units which did not pass testing. Technicians continue installing heat shields around the three main engines. A functional check of the Orbiter Docking System is scheduled for Friday. On Saturday, the astronauts will conduct the crew equipment interface test (CEIT). The Russian Mir-2 Docking Module interface verification test (IVT) to verify connections is now scheduled for September 19 and 20 of next week. A state of health check will follow on the 21st. Payload closeouts will begin on September 25 and the payload bay doors will be closed for flight on or about the 27th. The Space Shuttle **Atlantis** solid rocket booster repair work is scheduled to begin on September 24 in the VAB. **Atlantis** rollover to the VAB is scheduled for 9:00 a.m., October 2. Work continues to deconfigure and deservice **Discovery** in preparation for the ferry flight to Palmdale, CA. The ferry flight OMS pods are now scheduled to be installed on September 14 (left pod) and September 16

(right pod). The payload bay doors will be closed September 16, and the ferry flight tail cone installed next week. **Discovery** will be towed to the Shuttle Landing Facility September 25 for mating to the 747 Shuttle Carrier Aircraft. The ferry flight is scheduled to commence on September 26. [**KSC SPACE SHUTTLE STATUS REPORT**, Sept. 13, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Sept. 14, 1995.]

September 14:

STS-73 TO LAUNCH SEPT. 28

NASA has set Thursday, September 28, as the official launch date for Shuttle Mission STS-73. The almost 16-day microgravity research flight aboard Shuttle **Columbia** is designed to increase scientific understanding of basic physical processes on Earth and in space, as well as prepare for more advanced operations aboard the International Space Station. As always, the launch date is contingent upon closure of any mission operation issues that could arise during the current Shuttle mission being flown by **Endeavour** or any of the ongoing hardware inspections - including solid rocket boosters - used during **Endeavour's** launch on September 7. The STS-69 booster inspections to date have found no anomalies and post-flight inspection work is expected to be completed by early next week. The launch window on September 28 opens at 9:35 a.m. EDT and extends for 2 1/2 hours. The planned mission duration is 15 days, 21 hours and 54 minutes. An on-time launch on September 28 would result in a landing around 7:30 a.m. EDT on Saturday, October 14. Flight controllers and astronauts will conduct a series of media briefings on September 20 previewing the mission, which is the second flight of the United States Microgravity Laboratory (USML-2). Briefings will originate from the Johnson Space Center (JSC) [Houston], where Orbiter operations will be controlled during the flight, and the Marshall Space Flight Center (MSFC) [Huntsville], where a variety of scientific experiments in the Spacelab science workshop in **Columbia's** cargo bay will be orchestrated from the Payload Operations Control Center. [Banke, **FLORIDA TODAY**, Sept. 8, 1995; NASA/KSC Note to Editors: N95-60, Sept. 14, 1995.]

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EXPENDABLE VEHICLE LAUNCH ADVISORY

Delta/RADARSAT; Delta/XTE: The launch of Delta/RADARSAT for the Canadian Space Agency originally scheduled to occur from NASA's Space Launch Complex 2 at Vandenberg Air Force Base in California has been rescheduled for no earlier than Oct. 18, 1995. The additional time to prepare for launch is necessary to implement the findings and recommendations of the Koreasat anomaly board which were released today by McDonnell Douglas. To assure confidence in the Delta II launch vehicle it will be necessary to remove the solid rocket boosters in order to perform the corrective actions. They will be replaced with a modified set. The launch of Delta/XTE for NASA from Launch Complex 17 at Cape Canaveral is expected to occur no earlier than November 8. For the same reason, the solid rocket boosters will be removed for re-work. New schedules for the Delta II launch processing and the associated solid rocket booster repair

and confidence work are being developed for each of these missions. New processing schedules for the RADARSAT and XTE spacecraft, which are currently in NASA spacecraft checkout hangars at Vandenberg Air Force Base and Cape Canaveral respectively, are presently being developed to support the upcoming activities. Firm launch dates for this pair of upcoming launches will become more clear after work is under way.

Atlas/SOHO: The launch of the European Space Agency's Solar Heliospheric Observatory (SOHO) aboard an Atlas IIAS rocket from Launch Complex 36 at Cape Canaveral has been rescheduled to occur between November 23 and November 27. This will allow additional time to perform some re-work to the spacecraft's reaction wheels, providing additional confidence in the spacecraft's reliability and longevity. SOHO is currently in the SAEF-2 spacecraft checkout facility at KSC. The Atlas IIAS booster manufactured by Lockheed Martin is scheduled to arrive at Cape Canaveral by C-5 aircraft on Friday, Sept. 15. [NASA EXPENDABLE VEHICLE LAUNCH ADVISORY, Sept. 14, 1995.]

September 15:

SPACE SHUTTLE STATUS REPORT

Both the flight readiness review and terminal countdown demonstration test for STS-73 have been completed and technicians have finished their solid rocket booster joint repair and confidence work. Each auxiliary power unit will be run in sequence for seven minutes, however; these will occur tonight beginning at 10:30 p.m. Hypergolic storable propellant loading operations (OMS fuel) also begin today. The rotating service structure will be retracted at 8:00 p.m. tonight. Next week's STS-73 processing work includes: aft main engine compartment closeouts; installation of flight crew equipment lockers; installation of contingency EVA spacesuits; external tank purge; USML battery charging and experiment fit checks; countdown preparations in Firing Room 3; and topping off pad liquid hydrogen and liquid oxygen storage tanks. Meanwhile, detailed inspection of **Endeavour's** repaired solid rocket booster nozzles and O-rings will be inspected at manufacturer Thiokol's Utah plant. Mission Managers for **Columbia's** STS-73 mission are awaiting the results of these tests before confirming the launch schedule of **Columbia** whose boosters - like those relied upon in **Endeavour's** just completed mission - have also been repaired by Thiokol. [Halvorson, **FLORIDA TODAY**, Sept. 15, 1995; **KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Sept. 15, 1995.]

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SHUTTLE FLEET PROCESSING REPORT

STS-74: The functional test of the Orbiter Docking System (ODS) has been rescheduled for Monday, September 18. The interface verification test (IVT) of the Russian Mir-2 Docking Module has been rescheduled for September 20-21. The state-of-health check will follow on September 22. Servicing of the water spray boilers and potable water servicing is complete. Technicians continue installing heat shields around the three main

engines, and aft main engine compartment closeouts are in process. On September 23, the astronauts will continue the crew equipment interface test (CEIT). The Space Shuttle **Atlantis'** solid rocket booster repair work is scheduled to begin on September 24 in the Vehicle Assembly Building; **Atlantis'** rollover to the VAB is targeted for 9:00 a.m. on October 2.

STS-69: The Wake Shield Facility was grappled at 9:598 a.m. EDT yesterday after 74 hours, 34 minutes of free flight. The astronaut spacewalk is scheduled to begin at 4:04 a.m. EDT on September 16, concluding at 10:24 a.m. Landing of **Endeavour** is planned for Kennedy Space Center on Monday, September 18, at approximately 7:41 a.m. weather permitting. The forecast at this time is generally favorable as high pressure ridge builds over the southeast. On Monday, the landing forecast calls for scattered clouds at low and mid-level, and a high layer of broken clouds. The visibility will be 7 to 10 miles with Northeast winds at 6-12 knots. There is a chance of showers offshore. Tropical Storm Marilyn is not expected to be an influence in the Cape Canaveral vicinity on Monday. Meanwhile, work continues to prepare **Discovery** for its ferry flight to Palmdale, CA. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Sept. 15, 1995.]

September 18:

ENDEAVOUR LANDS AT KSC ON TIME

Touchdown of **Endeavour** occurred on Runway 33 at the Shuttle Landing Facility at 7:37:56 a.m. EDT this morning. At wheels stop, the STS-69 mission elapsed time was 10 days, 20 hours, 29 minutes, 52 seconds. The Orbiter was towed from the runway starting at 11:22 a.m. and arrived in front of OPF Bay 3 at 12:50 a.m. Work will now begin to establish access, offload residual cryogenic reactants, and open the payload bay doors. The Wake Shield Facility and the Spartan will be removed from **Endeavour's** payload bay next Saturday, September 22. Spartan will be transported to the Multipurpose Processing Facility (MPPF) in the KSC Industrial Area. The Wake Shield Facility will be taken to NASA Hangar AE on Cape Canaveral Air Station. Removal of the Spartan data tapes and the Wake Shield Facility samples are expected to occur in the early part of next week. The STS-69 astronauts returned to Houston at approximately 4 p.m. EDT today. The solid rocket boosters from **Endeavour's** launch have been inspected and no hot gas paths to the nozzle O-Ring seals were observed. Meanwhile, on STS-73, the launch pad is closed today for ordnance work. When the pad reopens later tonight **Columbia's** aft main engine compartment closeouts will begin. All activity at this time is on schedule for a launch at 9:35 a.m. on Thursday, September 28. Other activity scheduled this week includes countdown preparations in Firing Room 3, installing the contingency EVA spacesuits into **Columbia's** airlock, installation of the flight crew equipment lockers in the mid-deck area, charging of the experiment support equipment in the USML-2 laboratory, purging the external tank to condition it for its load of liquid hydrogen and liquid oxygen, and top off the pad storage tanks with those propellants. The STS-73 countdown begins at 4:00 p.m. Monday, September 25; the astronauts will arrive at KSC at 7:00 a.m. the same day. In OPF Bay 2, preparations are

underway on **Atlantis** for the Interface Verification Test (IVT) of the Russian Mir-2 Docking Module on Wednesday and Thursday this week. Repair of the STS-74 solid rocket boosters will be performed in the Vehicle Assembly Building starting September 24. **Atlantis's** rollover to the VAB is scheduled to occur on October 2. Launch is targeted for November 2. [Cabbage, **FLORIDA TODAY**, Sept. 18, 1995; Halvorson, **FLORIDA TODAY**, pp. 1A-2A, Sept. 19, 1995; Borenstein, **THE ORLANDO SENTINEL**, Sept. 19, 1995; **SPACE SHUTTLE STATUS REPORT**, Sept. 18, 1995.]

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TEST VALIDATES SEALS

Columbia has been cleared for launch next week because of something that occurred earlier this month, i.e., **Endeavour's** repaired solid rocket booster nozzles came through their September 7th mission in good shape. KSC spokeswoman **Lisa A. Malone** said today that nozzle inspections by the rocket's manufacturer in Utah showed there had been no damage to the SRB seals on **Endeavour's** flight. "All of the postflight inspections show they came out clear," she said. **Columbia's** boosters were also repaired and its liftoff has been contingent on the successful performance of **Endeavour's** boosters. ["**Endeavour's** Seals Pass Test," **FLORIDA TODAY**, Sept. 18, 1995.]

September 19:

SCHEDULE IN 'GOOD SHAPE'

Saying the short ten-day turnaround between **Endeavour's** landing and **Columbia's** launch should pose no problems, KSC spokesman **Bruce Buckingham** added, "We're in good shape. It really doesn't place any additional burdens on anyone because we schedule it well in advance." Nevertheless, when Mission Managers get the results of tests on **Endeavour's** solid rocket booster nozzles, they will decide whether **Columbia** is otherwise fit for flight. Booster inspections from the launch showed the repairs to have been effective. **Columbia's** 16-day mission is scheduled for launch at 12:05 p.m. on September 28. [Cabbage, **FLORIDA TODAY**, Sept. 20, 1995.]

September 20:

EG&G'S DUBAY RESIGNS

Jim Dubay will resign as EG&G Florida general manager and EG&G corporate vice president, effective September 29. In his resignation statement, Dubay said that he resigned "to pursue a set of personal initiatives that would not be compatible with his responsibilities to EG&G." He declined further comment. KSC spokesman **Bruce Buckingham** said he had no knowledge of whether Dubay's leaving his position was connected with the 112-day strike against EG&G. He said, "As far as we are aware, it was an internal [company] decision." [Reid, **FLORIDA TODAY**, pp. 10C & 9C, Sept. 20, 1995.]

September 22:

FERRY FLIGHT FOR DISCOVERY

The Orbiter **Discovery**, NASA's most prolific space-faring vehicle and a veteran of 21 Space Shuttle missions, will leave KSC on September 26 for a scheduled period of orbiter modifications (OMDP). **Discovery** will spend about nine months at Rockwell's Palmdale, CA, Orbiter Modification Center, where about 100 modifications will be performed on the vehicle. The most extensive of these will be the installation of an external airlock (replacing the current airlock) to support international Space Station operations. Also, **Discovery** will be modified to accept a 5th set of onboard cryogenic tanks. This will enable the Orbiter to remain in space several days beyond its current capability. Other work includes thermal protection system repairs and replacements, installation of upgraded hardware for improved payload bay flood lighting, star-tracker shutter replacements and structural corrosion inspections. This is **Discovery's** second OMDP. Its first was performed at KSC in 1992. **Discovery** is scheduled to be rolled out of KSC's Orbiter Processing Facility Bay 1 at about 5 a.m. Monday September 25 and towed to the Shuttle Landing Facility where it will be mated atop the 747 Shuttle Carrier Aircraft. Departure of the Orbiter/SCA is scheduled for about 7 a.m. Tuesday, September 26. **Discovery's** route to Palmdale will include a refueling stop at Fort Worth Naval Air Station in Texas and an overnight stay at Salt Lake City International Airport in Utah. **Discovery** will then continue its ferry flight to California, arriving in Palmdale early Wednesday afternoon, September 27. All ferry flight plans are subject to weather restrictions and alternate landing sites may be selected en route if necessary. Following this modification period, **Discovery** is scheduled to return to KSC in June 1996. **Discovery's** next flight, the second mission to service the Hubble Space Telescope, is targeted for launch in early 1997. [NASA/KSC Release No. 94-95, Sept. 22, 1995.]

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BAMSI AIMS FOR SHUTTLE PROGRAM CONTRACT

BAMSI, Inc. [Titusville, FL] has joined the competition for the new Space Shuttle Program contract; the other competitors are Boeing, McDonnell Douglas and United Space Alliance [a joint venture by Lockheed Martin and Rockwell]. BAMSI, Inc. was founded in 1978 by Hugh Brown as a small disadvantaged business but has long since outgrown that status. The new NASA contract will consolidate 85 existing contract into a single contract managed by one company. NASA officials plan simultaneously to reduce their oversight of the program, while continuing to maintain responsibility for planning missions and approving each launch attempt. [Borenstein, THE ORLANDO SENTINEL, Sept. 23, 1995; Banke, FLORIDA TODAY, Sept. 23, 1995.]

September 25:

DISCOVERY OVERHAUL SET FOR CALIFORNIA

Despite the fact that overhauling **Discovery** in Florida would be cheaper, NASA has decided to send the Orbiter to California for its OMDP [Orbiter Maintenance Down Period]. Congressman **Dave Weldon** said, "We can do this job at Kennedy and we can save the taxpayers. It makes sense from every way you look at it, except for getting

votes out of the Southern California delegation." Because the modifications to the Orbiter will be major, said NASA's Shuttle Director **Bryan O'Connor**, it was decided to make the changes in the California plant where the Shuttles were built. [Borenstein, **THE ORLANDO SENTINEL**, Sept. 26, 1995.]

September 26:

INTERIOR SECRETARY AT KSC

Interior Secretary **Bruce Babbitt** is scheduled to visit the Kennedy Space Center on Wednesday, September 27, to release an eagle as part of his continuing interest in the environment and the upcoming re-authorization of the Endangered Species Act. Babbitt will be available by appointment for press interviews at the Merritt Island National Wildlife Refuge Visitor Center from 8:45 a.m. to 9:30 a.m. on Wednesday. At 9:30 a.m. those interested will be escorted to a 12-foot observation tower along the Black Point Wildlife Trail where Babbitt will release an immature eagle. Nicknamed "Merritt," the eagle was found in an emaciated condition by refuge officials in July. Since that time, the bird has been successfully treated by the Florida Audubon Society's Center for Birds of Prey. Babbitt will be available for press interviews after the eagle is released. KSC Director **Jay F. Honeycutt**, KSC's Associate Director **Al Parrish**, a group of fifth graders from Oak Park Elementary School [Titusville, FL], and members of the Florida Audubon Society will also be present for the eagle release. [NASA/KSC Release No. 97-95, Sept. 26, 1995; .]

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COLUMBIA ON TRACK FOR LAUNCH

"I think there's an excellent chance to launch Thursday [September 28], especially early in the launch window," said KSC spokesman **Bruce Buckingham**. "The vehicle is in great shape, but the weather might get a little iffy later in the window." Air Force meteorologists predict a 60 percent chance of weather favorable to launch on schedule. Liftoff is set to occur between 9:35 a.m. and 12:05 p.m. Meanwhile, the Space Shuttle **Discovery** is set to be ferried to California for modifications costing some \$57 million. [Halvorson, **FLORIDA TODAY**, Sept. 27, 1995; Banke, **FLORIDA TODAY**, .]

September 27:

INTERIOR SECRETARY RELEASES EAGLE

Secretary of the Interior **Bruce Babbitt** visited the Merritt Island National Wildlife Refuge today to make political points for the Endangered Species Act. As part of his appearance, Babbitt was photographed releasing an American Bald Eagle; the eagles had been listed as an endangered species, but their population has increased to the point where it is expected to survive on its own in the wild. The list had been frozen while Congress revised the law. Orlando Congressman **Bill McCollum** [R] said, "There are a few things that need to be repaired [in the law], and then the act can come back into being." [Misselhorn, **FLORIDA TODAY**, pp. 1B-2B, Sept. 28, 1995; Quintana, **THE ORLANDO SENTINEL**, p. A-12, Sept. 28, 1995.]

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MORE FUEL TANK HOLES

Birds have again been snacking on the orange insulation of the Space Shuttle **Columbia's** external tank; this time, however, the number of holes has been small by comparison to the 200 drilled by woodpeckers in the summer. According to NASA spokeswoman **June Malone**, the newest pests are not woodpeckers. Workers found several 3/4 inch holes which they suspect were drilled early in the morning. "When you clear the pad, you can't have your people around there to scare the birds away," said KSC spokesman **Bruce Buckingham**. [Borenstein, "Pesky Birds Peck Holes In Fuel Tank," **THE ORLANDO SENTINEL**, Sept. 28, 1995.]

September 29:

NEW FUEL VALVE FOR Columbia

A new fuel valve has been ordered for **Columbia** in the wake of a potentially explosive leak of liquid hydrogen five hours before the vehicle was supposed to launch yesterday. Another attempt has been planned for October 5. In the interim, technicians will remove the faulty valve, install another valve, then test it. "If the valve passes the tests, then we can continue on with preparations for launch," said **Bruce Buckingham**, KSC spokesman. The countdown would resume at 4 a.m. October 2, leading to a launch between 9:40 a.m. and 12:05 p.m. on Thursday. **Columbia's** delay marked the ninth time this year that a Space Shuttle has failed to launch as scheduled. [Halvorson, **FLORIDA TODAY**, pp. 1A-2A, Sept. 29, 1995; Borenstein, **THE ORLANDO SENTINEL**, pp. A-1 & A-3, Sept. 29, 1995; Halvorson, **FLORIDA TODAY**, Sept. 30, 1995.]

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SPACE STATION BILL PASSES HOUSE

"This was a sweet ending to a long fight," said Melbourne's Rep. **Dave Weldon** concerning the seven-year funding bill which has just passed the U.S. House of Representatives. The bill provides a guarantee of \$13.14 billion over seven years, not to exceed \$2.12 in any one fiscal year. Rep. **Robert Walker** [R. PA] said, "This is a great day for America" and "a giant leap forward in securing the trust of those nations that have entered into cooperative agreements with us." NASA Administrator **Daniel S. Goldin** joined Congressmen to celebrate the funding measure and commented, "It says America is actually committed to doing it, instead of just debating it every year." [Wheeler, **FLORIDA TODAY**, Sept. 29, 1995.]

OCTOBER

October 1:

SIX KSC WORKERS HONORED

Five members of Kennedy Space Center's Shuttle Operations Directorate and a member of the NASA Safety, Reliability and Quality Assurance Directorate have been honored with Silver Snoopy Awards. Astronaut **Andy Thomas** presented Snoopys to Shuttle Operations employees **Laurie Buckley** and **Robert Frostrum, Jr.** Astronaut **Marsha Ivins** presented Snoopys to three other members of the directorate: **Peter Musto**, **Roger Sarkovics** and **Jeffrey G. Spaulding**. Ivins also presented a Snoopy to **Allen England** who works in the Safety, Reliability and Quality Assurance Directorate at Kennedy Space Center. ["Astronauts Honor Six KSC Workers," FLORIDA TODAY, Oct. 1, 1995.]

October 3:

ASTRONAUT VEACH DIES

Space Shuttle Astronaut **Charles Lacy Veach**, 51, died today following a lengthy illness. Veach was selected to be an astronaut with the class of 1984 and flew as a mission specialist on two Shuttle flights - STS-39 in April/May 1991 and on STS-52 in October 1992. "Lacy Veach was an accomplished and beloved member of the NASA family," said NASA Administrator **Daniel S. Goldin**. "He was a skilled pilot and an enthusiastic explorer. We will miss him." On STS-39, an unclassified Department of Defense mission aboard **Discovery**, Veach participated in various experiments, including working with an ultraviolet astronomical camera, an X-Ray telescope, and a liquid-helium-cooled infrared telescope which performed observations of the Earth's atmosphere and the Aurora Australis (Southern Lights). During STS-52, Veach and the crew deployed the Laser Geodynamics Satellite, a reflective spacecraft designed to measure movements of the Earth's crust. Veach also operated the Shuttle's robot arm to test the Space Vision System designed to improve perception of crew members while maneuvering payloads in space. [NASA/KSC News Release: 95-166, Oct. 3, 1995; "Astronaut Veach Dies of Cancer," FLORIDA TODAY, Oct. 3, 1995; "Astronaut Dies At Age 51," HOUSTON CHRONICLE, p. 5A, Oct. 4, 1995.]

October 4:

WELDON: SAFETY & JOBS AT STAKE

"To make abrupt changes in a program of this complexity can have the potential of unintended consequences," said Rep. **Dave Weldon** (R-Melbourne), Vice Chairman of the House space subcommittee. "We need to simultaneously work to try to eliminate the uncertainty for the employees while we make sure that we do not ruin our Shuttle Program, and we do not drop another Orbiter in the Atlantic," he said. Weldon visited the Space Center today along with the chairman of the subcommittee, Rep. James Sensenbrenner (R-Wisconsin). NASA spokesman **Ed Campion** responded to the concerns expressed by Weldon and Sensenbrenner by saying that NASA is doing everything it can to keep Congress and employees informed about the plan to consolidate

operations under a single prime contractor. He added that safety remained the top concern of NASA. Rep. Sensenbrenner said, "NASA has given us no concrete date on how the prime contract will work. I don't like to be kept in the dark by an agency that I'm supposed to oversee and an agency that I'm supposed to write budget authorization bills for." [Halvorson, FLORIDA TODAY, Oct. 5, 1995.]

October 5:

STS 73 RESCHEDULED FOR OCTOBER 6

Columbia remained grounded today due to the threat of Hurricane Opal; the mission has been rescheduled to commence at 9:40 a.m. tomorrow. NASA officials said that the likelihood of windy conditions - 23 mph - and high seas - up to 14 feet - at Cape Canaveral spawned by Opal caused the delay. Windy conditions on October 6 could push the launch date to October 6. NASA managers are also keeping their eyes on Tropical Storm Pablo now forming in the Atlantic Ocean, but currently several days from the Lesser Antilles. [Cabbage, FLORIDA TODAY, Oct. 3, 1995; "Hurricane Threatens Shuttle," THE NEW YORK TIMES, Oct. 3, 1995; Halvorson, FLORIDA TODAY, Oct. 4, 1995; Carreau, HOUSTON CHRONICLE, p. 5A, Oct. 4, 1995; Burnett, THE ORLANDO SENTINEL, Oct. 5, 1995; Halvorson, FLORIDA TODAY, Oct. 5, 1995; "Squalls Delay Columbia," HOUSTON CHRONICLE, p. 18A, Oct. 5, 1995; Borenstein, THE ORLANDO SENTINEL, Oct. 6, 1995.]

October 6:

STS 73 POSTPONED, CONTROLLER PROBLEM

NASA Launch Director **Jim Harrington** announced at 10:00 a.m. that the STS-73 launch would be postponed today. The delay will be at least 48 hours. Officials will meet this morning to discuss repairs and schedules. Launch controllers identified a problem with one of the two master events controllers before 9:00 a.m. today. This unit sends the signals to fire the pyrotechnic devices that fire the solid rocket booster hold down bolts at launch, and jettison the solid rocket boosters and the external tank during ascent. This unit is located in the aft compartment and may have to be replaced and retested. The external tank will be drained of liquid oxygen and liquid hydrogen propellants and access to the aft compartment established. NASA Test Director **John Guidi** told the flight crew, "We did our best today and we sure hope to see you back here very soon and try all the way down to T zero and a safe launch." In 1984, on Mission STS-41-D, launch was delayed 24 hours because of an incompatibility between the master events controller and the flight software relating to solid rocket booster fire commands. During the 24-hour delay, a software patch was verified and implemented to assure all three booster fire commands were issued in the proper time interval. [KSC News Release, Oct. 6, 1995; Halvorson, FLORIDA TODAY, Oct. 7, 1995; Borenstein, THE ORLANDO SENTINEL, Oct. 7, 1995; "NASA Delays Shuttle Launch for A 3rd Time," CHICAGO TRIBUNE, Section 1, Oct. 7, 1995; Halvorson, FLORIDA TODAY, Oct. 8, 1995; Borenstein, THE ORLANDO SENTINEL, Oct. 8, 1995; Wilford, THE NEW YORK TIMES, Oct. 8, 1995; Carreau, HOUSTON CHRONICLE, p. 21A, Oct. 8, 1995; "Shuttle Delayed Again," USA TODAY, p. 4A, Oct. 9, 1995.]

October 7:

TITAN 4 LAUNCH MOVED TO NOV. 4

A delay in launching a science satellite on a commercial Delta rocket will allow the Air Force to launch a communications satellite via the Titan 4 on November 4 rather than November 13. "We always work toward launching earlier, if possible," said Major **Frank Arena**, Commander of the Air Force's 5th Space Launch Squadron at Cape Canaveral Air Station. The launch window runs from 10:30 p.m. November 4 through 12:33 a.m. November 5. The Delta rocket, which was to launch the X-Ray Timing Explorer for NASA, was sidelined due to the continuing inquiry into an August 4 Delta mission which left a Korean satellite in an orbit lower than intended. Preliminary investigations suggest that ordnance lines which route ignition and separation signals were damaged by excessive heat. [Halvorson, **FLORIDA TODAY**, Oct. 7, 1995.]

October 8:

STS-73: SPARE PART SHOULD HELP

With a fifth launch attempt scheduled for October 14, **Columbia** has been outfitted with a spare electronics unit today. "The replacement operation and the retest are the critical components to getting **Columbia** ready to fly again. When we get in Tuesday morning [following the Columbus Day holiday], we should have the results of the test," said KSC spokesman **Bruce Buckingham**. Senior Mission Managers have the option of postponing the mission till mid-November in order to clear the schedule for the launch of **Atlantis'** STS-74 mission to dock with the Russian Mir Space Station. [Halvorson, **FLORIDA TODAY**, Oct. 9, 1995.]

October 10:

APOLLO SATURN V LUT RELOCATION

Sections of the Apollo Saturn V Launch Umbilical Tower (LUT) and the hammerhead crane will become part of a permanent display in the new Apollo/Saturn V Center, currently under construction at the Kennedy Space Center. Tomorrow, freshly painted sections of the LUT will be moved to from the stowage yard on 5th Street behind the KSC Headquarters Building to the construction site, located at the northern end of the Banana Creek guest viewing site in the Launch Complex 39 area. Delaware North Park Services of Spaceport Inc. has been overseeing refurbishment of sections of the LUT for inclusion in the 99,000-square-foot Apollo/Saturn V Center. Because of its size, the LUT, as well as the Saturn V vehicle, will be moved into the building prior to the completion of construction. The Apollo/Saturn V Center will be a major new facility on the KSC public tour and is designed to preserve an original Saturn V vehicle, a lunar lander, and other major artifacts from the Apollo/Saturn era. Exhibits and shows will include a realistic re-creation of an Apollo firing room, a lunar landing and splashdown. Visitors to the center will enjoy an historical perspective of the significance of the manned lunar program. It is anticipated that construction will be complete and the facility will be opened to the general public in late 1996. [NASA/KSC News Release No. 103-95, Oct. 10, 1995.]

FIFTH ATTEMPT SET FOR STS-73

NASA Mission Managers for STS-73 have scheduled a fifth launch attempt for **Columbia** on Saturday, October 14. A Lockheed Martin Atlas is scheduled to launch the following day. "It looks likely," however, "that we'll get a second opportunity if we need it, but nothing is chiseled in stone yet," said KSC spokesman **Bruce Buckingham**. Negotiations are underway to see whether the Air Force and Lockheed will agree to postpone their Atlas launch in the event a sixth launch attempt is necessary. "We may not even need a launch attempt on Sunday [October 15], so it's something that we may not even have to fuss with," Buckingham said, "But with this mission, nothing is guaranteed." The new countdown will provide a launch window between 9:46 a.m. and 12:16 p.m. on Saturday. Should NASA need a seventh launch attempt it has two choices, a launch effort on October 19 or 20 or delay the mission till after the upcoming **Atlantis-Mir** mission, STS-74. [Halvorson, FLORIDA TODAY, p. 1A, Oct. 11, 1995; Borenstein, THE ORLANDO SENTINEL, Oct. 11, 1995; "NASA Plans for Shuttle to Lift Off On Saturday," THE WASHINGTON POST, p. A15, Oct. 11, 1995; Carreau, HOUSTON CHRONICLE, Oct. 11, 1995; Carreau, HOUSTON CHRONICLE, Oct. 12, 1995.]

October 11: HURRICANE ROXANNE WATCHED FOR IMPACT

"We have a very similar weather scenario as we had last week," said **Joel Tumbolio**, Air Force weather officer. "Last week it was [Hurricane] Opal. This week it's Roxanne." Forecasters are predicting a change of rains and high winds on the East Coast in the aftermath of Roxanne. There remain two potential launch dates - October 19 or 20 - for **Columbia** should the October 14 attempt be scrubbed. [Halvorson & White, FLORIDA TODAY, Oct. 12, 1995.]

October 13: STS-73: LAUNCH ADVISORY

NASA Managers have postponed launch of Space Shuttle **Columbia** on Mission STS-73 24 hours to Sunday, October 15th in order to work an issue with the Shuttle Main Engine and another with the Orbiter's onboard computer. The launch window on October 15th opens at 9:46 a.m. and extends for 1 1/2 hours, closing at 12:16 p.m. EDT. The current weather forecast for Sunday calls for a 70 percent chance of unacceptable conditions for launch mostly due to potential cloud cover and cross wind conditions that are after effects of Hurricane Opal. The issue with the Shuttle Main Engines involves inspection work that is required because of a crack found in a high pressure oxidizer duct on a main engine being tested at NASA's Stennis Space Center in Bay St. Louis, Mississippi, earlier this week. Inspection of the failed duct indicates the cracked happened in a weld area and was due to the duct wall being too thin. The work on **Columbia** will involve ultrasonic inspection of the welds on each engine's high pressure oxidizer duct to ensure proper wall thickness. There are seven different welds on each engine duct. The inspection work will begin later today. A separate issue is being worked by the launch team with one of **Columbia's** General Purpose Computers (GPC).

During prelaunch testing, the ground crew noticed an unusual response in the data transmission between the GPC and associated electronic hardware. Further evaluation will determine whether the GPC needs to be removed and replaced. If removal and replacement is needed, it would not impact a Sunday launch opportunity. The schedule of significant events starts at 1:20 a.m. EDT with the loading of 1/2 million gallons of liquid hydrogen and liquid oxygen into the External Tank. The STS-73 crew will don their flight suits at about 5:41 a.m. EDT and depart the O & C Building for the launch pad at 6:21 a.m. EDT. Shuttle Managers plan to meet late Saturday afternoon to assess the status of both issues before making a final go for launch on Sunday morning. [NASA Launch Advisory, Oct. 13, 1995.]

October 14:

STS-73 ISSUES CLOSED FOR LAUNCH

NASA Managers have closed the two open issues with flight hardware which caused a one-day postponement of the launch of **Columbia** on Mission STS-73. The issue with a duct on the main engines was resolved by technicians taking ultrasonic measurements of the duct to verify adequate wall thickness. That work along with additional data analysis have allowed engine managers to conclude that there are 3 good main engines on **Columbia**. The issue with a General Purpose Computer (GPC) was resolved by removing and replacing the suspect unit. The new GPC installed in **Columbia** has been tested and approved for flight support. Launch of **Columbia** tomorrow morning is currently targeted for 9:46 a.m. EDT at the start of a 2 1/2 hour window which is based on crew on back time. The current weather forecast for Sunday calls for an 80% chance of violating launch criteria. Since the available launch period extends to 1:35 a.m. EDT based on the Transoceanic Abort Landing (TAL) lighting conditions at Ben Garir, Morocco, Shuttle managers are considering an option of delaying crew wake up and departure for launch pad in an effort to get the best 2 1/2 hour period for launch in terms of weather. The launch team will continue to evaluate the weather forecast this evening and into tomorrow morning. A decision on adjusting the crew timeline must be made before the scheduled 4:00 a.m. wake up. Should **Columbia** not launch tomorrow, Shuttle Managers plan to meet on Sunday afternoon to discuss where to proceed with the STS-73 mission. The two main options available to the launch team are to try additional STS-73 launch attempts later in the week around the October 19th/20th time frame or to move the STS-73 mission to mid-November and proceed with **Atlantis** and the STS-74/Shuttle-Mir-2 flight as the next mission to be flown. [Halvorson, **FLORIDA TODAY**, Oct. 13, 1995; Halvorson, **FLORIDA TODAY**, Oct. 14, 1995; Cabbage, **FLORIDA TODAY**, pp. 1A-2A, Oct. 14, 1995; Borenstein, **THE ORLANDO SENTINEL**, p. A1, Oct. 14, 1995; NASA Launch Advisory, Oct. 14, 1995; Halvorson, **FLORIDA TODAY**, pp. 1A-2A, Oct. 15, 1995; Halvorson, **FLORIDA TODAY**, Oct. 16, 1995; Borenstein, **THE ORLANDO SENTINEL**, Oct. 16, 1995.]

October 16:

STS-73: SCRUB TURNAROUND ACTIVITIES

Columbia's external tank has been drained of liquid hydrogen and liquid oxygen as part of scrub-turnaround activities at Launch Complex 39B. PRSD reactant tophoff is scheduled for October 17; mid-deck payload servicing is planned for October 18. The countdown to launch of STS-73 will resume at the T-11 hours mark at 3:35 p.m. EST. The crew of **Columbia** will remain at KSC until the next launch attempt. Launch of STS-73 was postponed today by Launch Director **Jim Harrington** who said, "We gave it the college try, but the weather just beat us." The seventh launch attempt for **Columbia** will occur between 9:49 a.m. and 12:19 p.m. October 19 [Thursday]. The attempt will be automatically postponed a day if the planned launch October 17 of a Lockheed Martin Atlas rocket from Cape Canaveral Air Station is delayed until October 18 [Wednesday]. The STS-74 astronauts arrived at KSC yesterday afternoon for the Terminal Countdown Demonstration Test, the countdown dress rehearsal for the second Mir Docking Mission. The countdown for the TCDT will begin at 8:00 a.m. on October 17 [Tuesday] and conclude at 11 a.m. the following day. Checks of **Atlantis'** solid rocket booster flight controls have been completed. Preparations are in work for the upcoming hypergolic servicing. An environmental purge sequence of the Russian MIR-2 Docking Module is scheduled for October 23 to be followed by closing the payload bay doors for flight. Prelaunch preparations are targeting a launch on November 8, however, launch may occur on November 9 or November 10 pending the actual liftoff of STS-73. **[[KSC SPACE SHUTTLE STATUS REPORT, Oct. 16, 1995; Halvorson, FLORIDA TODAY, p. 1A, October 16, 1995.]**

October 17:

STS-73: FRIDAY LAUNCH ATTEMPT

With the weather-related scrub of the commercial Atlas rocket, mission managers for STS-73 are proceeding with the plan to reschedule the launch of **Columbia** for Friday, October 20. The launch window opens at 9:50 a.m. EDT and closes 2 1/2 hours later.. Turnaround activities have been worked today and completed. PRSD reactant tophoff and replenishment of pad liquid oxygen storage tank are underway today. Mid-deck payload servicing is targeted for October 19 and the countdown will be resumed at T-11 hours or 7:30 p.m. At 1:00 a.m. Friday, the external tank will be loaded with liquid hydrogen and liquid oxygen. The progress of the countdown and mission is again being posted on the internet's World Wide Web at <http://www.ksc.nasa.gov/shuttle/countdown> and at <http://shuttle.nasa.gov>. Meanwhile, the STS-74 astronauts are participating in launch pad emergency training today. The countdown for the terminal countdown demonstration test began at 8:00 a.m. today and will conclude at 11:00 a.m. tomorrow. The astronauts are onboard for the last three hours of the mock countdown. Ultrasound testing of the Orbiter's main engine high pressure liquid oxygen ducts has been completed with no issues or concerns. Preparations are in work for the hypergolic servicing which will be performed starting next Monday. A state-of-health check for the Russian MIR-2 Docking Module is being performed today. An environmental purge sequence of the

module is planned for November 2-3 to be followed by closing the payload bay doors for flight. Preparations are underway for installing the Remote Manipulator System in **Endeavour's** cargo bay. Fuel cell testing has also begun. In the Vehicle Assembly Building, stacking of the right forward center solid rocket booster segment is in work today. Stacking of the right forward segment is planned for late tomorrow or Thursday [October 19]. [**KSC SPACE SHUTTLE STATUS REPORT**, Oct. 17, 1995; Halvorson, **FLORIDA TODAY**, p. 1A, Oct. 17, 1995; Borenstein, **THE ORLANDO SENTINEL**, p. A-9, Oct. 18, 1995.]

October 19: STS-73 COUNTDOWN RESUMES, AGAIN

As NASA turns to a seventh attempt to launch **Columbia** on its STS-73 mission, the countdown picks up again today. The weather forecast for launch day remained grim. "All you can do is press on and hope for the best," said **Bruce Buckingham**, KSC spokesman. Continuing uncertainty about launch dates has caused planners to consider a variety of schedule alternatives. [Borenstein, Halvorson, **FLORIDA TODAY**, p. 1A, Oct. 19, 1995; Borenstein, **THE ORLANDO SENTINEL**, Oct. 19, 1995.]

October 20: STS-73 LAUNCHES ON 7TH ATTEMPT

The Space Shuttle **Columbia** lifted off at 9:53 a.m. during a break in the clouds to begin its STS-73 mission on its seventh attempt. "Patience and perseverance are a couple of real good virtues to have in this business, along with a couple of real crack weathermen and a superhuman launch team," said **Loren Shriver**, head of the Mission Management Team for NASA. Following the launch Capsule Communicator **Blaine Hammond** told **Columbia's** crew: "good things come to those who wait." **Columbia** had been prepared to launch six times during the previous 21 days, experiencing Hurricane Opal, a fuel leak, air in the hydraulic system, concerns about main engine cracks and generally foul weather. The Orbiter is expected to make an SLF landing at Kennedy on November 5 at 6:48 a.m. The numerous failed attempts to launch **Columbia** had one unintended side effect, KSC's Open House has been cancelled a second time. [Cabbage, **FLORIDA TODAY**, Oct. 20, 1995; "Open House Postponed Again at KSC," **FLORIDA TODAY**, Oct. 20, 1995; Cabbage, **FLORIDA TODAY**, pp. 1A & 10A, Oct. 21, 1995; Borenstein, **THE ORLANDO SENTINEL**, Oct. 21, 1995.]

0 ATLAS FREED TO LAUNCH

The launch of **Columbia** on its STS-73 mission has cleared the way for the launch of a Lockheed Martin Atlas rocket. The satellite-delivery mission - making its third launch attempt - is scheduled to liftoff from Launch Complex 36A between 4 and 6:40 a.m. on October 22. The rocket will carry a Navy communications satellite into orbit. Air Force meteorologists say there is a 20 percent chance that weather will violate launch criteria. The Atlas mission will be the ninth Atlas launch from Cape Canaveral Air Station this year. High winds prohibited two previous attempts to liftoff on the Department of

Defense mission. ["Atlas Rocket Launch Reset for Sunday," **FLORIDA TODAY**, p. 1A, Oct. 19, 1995; "Launch Frees Atlas For Flight," **FLORIDA TODAY**, Oct. 21, 1995.]

October 23:

MISSION UPDATES

The STS-73 solid rocket boosters arrived at Hangar AF on Sunday morning [October 22]. The boosters will be disassembled and preliminary post-flight inspections will be made. By the end of the week, motor segments will be shipped to booster manufacturer Thiokol in Utah for thorough inspections and refurbishment. Launch pad 39B sustained minimal damage as a result of the STS-73 launch. The STS-73 crew includes: Commander **Kenneth D. Bowersox**, Pilot **Kent V. Rominger**, Mission Specialists: **Catherine G. Coleman**, **Michael E. Lopez-Alegria** and **Kathryn C. Thornton** and Payload Specialists: **Fred Leslie** and **Albert Sacco**. The Launch Readiness Review is underway for STS-74; hypergolic propellants are being loaded into the Orbiter's onboard storage tanks. Launch Complex 39A has been cleared for the hazardous operation. A helium signature leak test and the flight readiness review is planned for October 26. On October 27, technicians will conduct a main engine controller checkout and flight readiness test, followed on October 30 by the beginning of aft engine compartment closeouts. The target date for the launch of STS-74 is now November 11 with a November 19 landing at KSC. Meanwhile work continues on **Endeavour** for its January 11 STS-72 launch. The Orbiter is in OPF Bay 3 where the vehicle's left orbital maneuvering system pod has been removed and transferred to the Hypergolic Maintenance Facility, **Endeavour**'s main engines will be installed on October 25 and 26. Final payload bay door closure is scheduled for November 21 with rollover to the Vehicle Assembly Building set for November 29. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Oct. 23, 1995.]

October 24:

STS-73: BOOSTER DISASSEMBLY

Work is continuing to disassemble the STS-73 solid rocket boosters at Hangar AF. Exterior thermal protection material is being removed by hydrolasing operations. The boosters will be disassembled and preliminary post-flight inspections will be made. By Friday [October 27], the nozzles will be shipped to booster manufacturer, Thiokol, in Utah for thorough inspections and refurbishment. During analysis of flight data from the STS-73 Reusable Solid Rocket Motors, engineers observed a slight chamber pressure variation in the left-hand motor about 73 seconds into flight. The pressure varied 2.4 percent from the normal pressure for only a portion of a second, then returned to near nominal operation pressure for the remainder of the flight. Variations of approximately this magnitude have been experienced on prior flights and are a natural attribute of normal motor performance and are expected occasionally during flights. The predicted maximum pressure variation is 3.2 percent from the normal operating pressure at any given time in the flight. The normal pressure at this point during ascent is 650 pounds per square inch (PSI). No anomalous condition has been identified associated with the occurrence and no safety concern for the flight has been identified on this or the

previous occurrences. The STS-73 crew are: Commander **Kenneth D. Bowersox**, Pilot **Kent V. Rominger**, Mission Specialists **Catherine G. Coleman**, **Michael E. Lopez-Alegria** and **Kathryn C. Thornton**; and Payload Specialists **Fred Leslie** and **Albert Sacco**. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Oct. 24, 1995.]

October 25:

BOOSTER DISASSEMBLY CONTINUES

Disassembly of the STS-73 solid rocket boosters at Hangar AF is continuing. Today, both boosters are scheduled to be moved into the hangar. The nozzles will be shipped to booster manufacturer Thiokol Corp. in Utah for thorough inspections and refurbishment on Friday. The STS-73 crew are Commander **Kenneth D. Bowersox**, Pilot **Kent V. Rominger**, Mission Specialists **Catherine G. Coleman**, **Michael E. Lopez-Alegria** and **Kathryn Thornton** and Payload Specialists **Fred Leslie** and **Albert Sacco**.

Meanwhile, hypergolic propellants have been loaded into **Atlantis'** onboard storage tanks, and hydrazine into the three auxiliary power units and booster thrust vector control system tanks. The Docking Module has been powered up for health checks; the galley's water supply has been sampled and preparations are underway for the STS-74 helium signature leak test. The flight readiness review is set for tomorrow and the main engine controller checkout and flight readiness test is planned for October 27. Aft engine compartment closeouts will commence Monday, October 30. In OPF Bay 3, installation of **Endeavour's** main engines for its STS-72 mission have begun. The vehicle's left orbital maneuvering system pod has been transferred to the Hypergolic Maintenance Facility. The left aft center booster segment was demated yesterday to allow for evaluation of contamination. Nothing significant was found and the segment is being remated today. Mating of the solid rocket boosters with the external tank in the VAB is planned for November 9 with final payload bay closure targeted for November 21 and rollover to the VAB will occur November 29. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Oct. 25, 1995.]

October 26:

STS-74 UPDATE

Completed work for STS-74 includes completion of the Russian Docking Module's State of Health Check, loading of hypergolic propellant into the orbital maneuvering system and reaction control system storage tanks and loading of hydrazine aboard the solid rocket booster thrust vector control system storage tanks. The helium signature leak test of **Atlantis'** main propulsion system occurs today. Scheduled STS-74 tasks: flight readiness test of flight controls, main engines and hydraulic systems tomorrow, main engine controller testing tomorrow, aft main engine compartment closeouts October 30 and the environmental purge of Russian Mir-2 Docking Module from October 31 through November 2. The flight readiness review was held today in the KSC Mission Briefing Room and was completed with no significant issues or concerns. Launch remains targeted for Saturday, November 11. Meanwhile, installation of **Endeavour's** three main engines for its STS-72 mission continues today. The rollover to the Vehicle Assembly

Building is planned for November 29. In the VAB, the left aft center booster segment has been remated. The external tank is scheduled to be attached to the solid rocket boosters on November 9. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Oct. 26, 1995.]

October 27:

DOCKING MODULE CHECKED

Technicians at Launch Complex 39A have completed a State of Health Check on the Russian Docking Module in the payload bay of **Atlantis**. They have also completed the STS-74 helium signature leak test of the main propulsion system. The Orbiter's computers have been activated and flight software has been loaded into the Mass Memory Units. Today, the technicians will conduct a flight readiness test of the flight controls, the main engines and the hydraulic systems. Main engine controller testing will also occur. STS-74 work scheduled: aft main engine compartment closeouts; changeout of main engine turbine discharge sensors; environmental purge of the Russian Mir-2 Docking Module and payload bay closure on November 2. Based on a recent test done at Stennis Space Center (Mississippi), a decision has been made to remove for testing the main engine turbine discharge temperature transducers. A total of twelve sensors will undergo dye penetrant testing to inspect for cracks or other signs of stress. This activity will take approximately two days to complete and has no impact to other scheduled work. Meanwhile, installation of **Endeavour's** three main engines for STS-72 has been completed. Mechanical securing is underway and the electrical connections will be established next week. Window No. 5 has been reinstalled after polishing. The rollover of **Endeavour** to the Vehicle Assembly Building is targeted for November 29. In the VAB, the left aft center booster segment has been remated. The left forward center segment will be mated on October 30. The external tank is scheduled to be attached to the solid rocket boosters on November 9 (Thursday). [KSC SPACE SHUTTLE STATUS REPORT, Oct. 27, 1995.]

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RADARSAT TO BE LAUNCHED NOV. 3

The Canadian Space Agency's RADARSAT spacecraft is scheduled to be launched at 6:22 a.m. PST on November 3, from NASA's Space Launch Complex 2 at Vandenberg Air Force Base, CA, aboard a McDonnell Douglas Delta II rocket. Kennedy Space Center is responsible for government oversight of the Delta II processing activities at Vandenberg Air Force Base, integration of the RADARSAT spacecraft with the launch vehicle and launch countdown activities. The Kennedy Space Center is also responsible for the launch and countdown activities, while Goddard Space Flight Center is responsible for the launch services contract with McDonnell Douglas. NOAA and the Jet Propulsion Laboratory will provide early on-orbit tracking support of the RADARSAT spacecraft. [NASA/KSC Releases No. 107-95, Oct. 27, 1995.]

October 28:

OPAL DAMAGES SPACEPORT FLORIDA SITE

Hurricane Opal's coastal destruction in the Florida panhandle this month severely damaged a Spaceport Florida Authority launch site, officials said last week. Storm surges during the hurricane washed away the launch pad, support buildings and an access road to the Cape San Blas launch site, which has been used in the past for small, suborbital rocket launches. Officials said the damage was so extensive that it might eliminate the possibility of future launches at the site. ["Hurricane Opal Slams Launch Site," **FLORIDA TODAY**, October 29, 1995.]

NOVEMBER

November 1: RADARSAT LAUNCH DELAYED TILL NOV. 4

The launch of Delta/RADARSAT for the Canadian Space Agency has been rescheduled by 24 hours. Additional time is necessary to complete the installation of the redesigned umbilical fairings located between the Delta first stage and the nine solid rocket boosters. All media and NASA Television activities are being rescheduled accordingly at Vandenberg Air Force Base, CA. [NASA/KSC News Release No: 116-95, Nov. 1, 1995.]

November 4: SATURN V TOWER SECTIONS MOVED

Sections of NASA's Saturn V moon rocket launch tower have been moved out of storage to a new display that will be opened at Kennedy Space Center late next year. Freshly painted sections of the Launch Umbilical Tower [LUT] as well as a hammerhead crane used at the moon rocket's launch pad recently were moved from a storage yard south of the KSC Headquarters Building to the Apollo-Saturn 5 Center now under construction at the space center. The new facility is being constructed at the northern end of the Banana Creek VIP viewing site, about two miles north of the Vehicle Assembly Building. A lunar lander and other major artifacts from the Apollo Era will also be housed at the new exhibition site. ["Saturn 5 Tower Moves From Storage," FLORIDA TODAY, Nov. 5, 1995.]

November 5: COLUMBIA HOME ON TIME

Now that the Space Shuttle **Columbia** has come home to Kennedy Space Center right on time, NASA Managers and Shuttle processing employees are free to turn their attention to the launch of **Atlantis** on November 11. Just after sunrise Sunday morning, Brevard County residents heard the two sonic booms which precede every Shuttle landing. **Ron Dittmore**, Shuttle Manager for **Atlantis**'s STS-74 mission, said, "There does not appear to be any issues that we need to work on that would prevent us from launching on schedule this coming Saturday. It looks like the deck is clear." [Cabbage, FLORIDA TODAY, Nov. 3, 1995; Halvorson, FLORIDA TODAY, p. Cabbage, FLORIDA TODAY, Nov. 4, 1995; Borenstein, THE ORLANDO SENTINEL, Nov. 4, 1995; Borenstein, THE ORLANDO SENTINEL, pp. A-1 & A-6, Nov. 6, 1995; Cabbage, FLORIDA TODAY, Nov. 5, 1995; Cabbage, FLORIDA TODAY, p. 1, Nov. 6, 1995.]

November 7: U.S. ALLIANCE TO PURSUE NEGOTIATIONS

NASA will pursue a non-competitive contract with United Space Alliance to eventually assume responsibility for Space Shuttle operations. "This clearly is the appropriate path to take," said NASA Administrator **Daniel S. Goldin**. "It will allow us to ensure the safe operations of the Space Shuttle, meet the flight manifest and maintain our commitment

to working with Congress to maximize the future commercial potential of the Station and make the best use of the American taxpayer's dollar." Rockwell International and Lockheed Martin Corporation, which together hold 69 percent of the dollar value of all Shuttle related prime contracts, will form a joint venture, "United Space Alliance," to become the Space Flight Operations contractor. Goldin said reaching a contract with U.S. Alliance depends on three factors. First, the two companies must form a viable, separate legal entity [U. S. Alliance] capable of operating the Shuttle program. Second, NASA and U.S. Alliance must negotiate a contractual arrangement that commits the contractor and provides appropriate incentives to maintain safety, meet the flight manifest and achieve program efficiencies. And third, the workforce which U.S. Alliance applies to the Space Flight Operations contract must possess sufficient experience with Shuttle operations that additional time-consuming training is unnecessary to keep the program progressing safely and efficiently. "With Lockheed Martin and Rockwell, we have two experienced companies that clearly understand how to operate the Shuttle safely," Goldin said. "There's no new contractor or workforce to train, and because the two companies already have 70 percent of the dollar value of all Shuttle-related prime contracts, the task of combining the existing separate contracts under the consolidated Shuttle contract will be greatly simplified." NASA's Administrator said the Source Evaluation Board, which has been evaluating expressions of interest from companies in becoming the Space Flight Operations Contractor, concluded that a non-competitive contract with U.S. Alliance was clearly in the public interest. "There was no other company that could possibly meet our safety, manifest and schedule requirements," said Goldin. "Under the circumstances, the advantages of contracting directly with U.S. Alliance outweigh any benefits from competition."

Goldin described the next steps which could lead to award of a non-competitive contract by September 1996:

- * Both parties must agree on a Statement of Work which adequately describes what the Space Flight Operations Contractor must do in performance terms. "We will tell them what we want in terms of outcome, but we will not dictate the steps to get there," said Goldin.
- * U.S. Alliance must prepare definitive technical and cost proposals that are responsive to the Statement of Work. These proposals must contain specific plans and commitments to reduce contract requirements, facilities and workforce.
- * NASA will evaluate these proposals and use them to develop an agreed-upon contractual document that incorporates all of U.S. Alliance's obligations and provides appropriate incentives to ensure the contractor maintains safety, meets the flight manifest and achieves efficiencies.

- * The parties must develop a phased contractual arrangement that commits U.S. Alliance to an initial effort to identify program efficiencies from within its current prime contracts and provides clear milestones to reach a final, definitive agreement on all aspects of Shuttle operations as soon as possible.

A single prime contract will reduce Shuttle costs by cutting out duplicative or unnecessary work while still performing all the work required for safe and reliable flights. Because NASA will no longer be heavily involved in the management of day-to-day Shuttle operations, fewer civil servants will be needed to manage the program. Republican Congressman **Dave Weldon** [Palm Bay], has expressed concern over the safety issue as NASA turns toward a single prime contractor. "I'm getting the feeling," he said, "that safety is not being lifted up as the paramount issue. It appears to me that dollars are driving a lot of the decision-making, and they are shooting for certain manpower numbers." Associate Administrator for Space Flight **Wayne Little**s responded, saying, "The restructuring of the Shuttle Program will be accomplished consistent with our established program priorities: Fly safely, meet the manifest and reduce costs." [Halvorson, FLORIDA TODAY, p. 1A-2A, Nov. 8, 1995; NASA/KSC Release No: 95-205, Nov. 7, 1995; Media Advisory, Nov. 7, 1995; Borenstein, THE ORLANDO SENTINEL, pp. A1 & A10, Nov. 8, 1995; Borenstein, THE ORLANDO SENTINEL, Nov. 11, 1995; Wheeler, FLORIDA TODAY, Nov. 26, 1995; Wheeler, FLORIDA TODAY, Nov. 28, 1995; Wheeler, FLORIDA TODAY, Dec. 1, 1995; Wheeler, FLORIDA TODAY, Dec. 6, 1995.]

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CRACKS FOUND IN TWO SHUTTLE BOOSTERS

Cracks were discovered in boosters used to launch **Discovery** in February and **Atlantis** in June. Boosters currently on **Atlantis** for its upcoming STS-74 launch have been inspected and no problems were uncovered. "The inspecting we've already done shows (the cracks) are not present in the skirts on the pad, and we don't see any reason to reinspect," said **John Chapman**, NASA's Deputy Project Manager for SRBs. "I don't anticipate that there will be any issues with the vehicle on the pad at all," he said. He said that indications were that the cracks were associated with the boosters' impact with "water impact" after booster separation. He continued, "We are pressing on with our analysis in trying to understand what caused these cracks." [Cabbage, FLORIDA TODAY, pp. 1A-2A, Nov. 7, 1995.]

November 8:

NASA CONTRACT: 7500 FEWER JOBS

In the five years after implementation of the single prime contract by NASA, 6,000 contractor employees and 1,500 civil servants will lose their jobs in the space program. Layoff figures for Kennedy Space Center were not immediately available, but NASA officials said the May estimates were fairly accurate. Those figures put the job loss at KSC at 2,000 contractor and 1,150 civil servants. Associate Administrator for Space Flight **Wayne Little**s said, I would expect to see some of our work force back away from

their tasks in the first year" of the contract's implementation. He added, "That does not necessarily translate itself into layoffs. We hope to depend as much as possible on attrition and people leaving in other ways [with] reassignments where we can." The new contract is scheduled to go into effect in late 1996. [Cabbage, **FLORIDA TODAY**, p. 1A, Nov. 9, 1995.]

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STS-74 COUNTDOWN RESUMES

The STS-74 countdown resumes today looking toward a November 11 launch of **Atlantis** on its second Mir docking mission. Prior to launch, however, Mission Managers will receive a briefing on cracks found on solid rocket boosters used on earlier flights this year by **Discovery** and **Atlantis**. KSC spokesman **Bruce Buckingham** said, "So far nothing has come to light that would keep us from launching. The thinking now is that there is no problem with the boosters at the pad, that there's no reason for concern." The boosters have been inspected and no defects have been discovered. Nevertheless, engineers continue their efforts to determine what caused the cracks on the February 3 and June 27 flights. [Halvorson, **FLORIDA TODAY**, p. 2A, Nov. 8, 1995; Borenstein, **THE ORLANDO SENTINEL**, Nov. 8, 1995.]

November 11:

STS-74 LAUNCH SCRUBBED

NASA scrubbed this morning's launch of Space Shuttle **Atlantis** on Mission STS-74 due to unacceptable weather conditions at the three available emergency Trans-Atlantic-Landing [TAL] sites. The external tank is being drained of cryogenic propellants. At this time [10:30 a.m. EST], weather conditions at the Ben Garir, Morocco, emergency site in Africa is forecast to be marginally better on Sunday. However, little change is anticipated at Zaragoza or Moron, Spain. All TAL sites, however, improve significantly beginning Monday continuing into early next week. Locally, a cold front will pass through Cape Canaveral vicinity about mid-evening with a squall line ahead of the front having associated rain and high wind. The rotating service structure will be moved into position around the Space Shuttle **Atlantis** early this afternoon for weather protection and will be retracted after the threat of bad weather has passed early tonight. The weather forecast at KSC for tomorrow calls for colder temperatures, an increase in sustained winds and a reasonable chance of having acceptable cloud conditions. The chance of launch weather criteria violation on Sunday [November 11] is 40%, but it increases to 60% on Monday and 70% on Tuesday as the result of a low pressure system forming over the southeast Atlantic Ocean which will drift northward.

The Mission Management Team will meet in the Launch Control Center tonight at 9:30 p.m. to assess the turnaround activities and readiness for tanking. Also, the progress of the cold front and the weather overseas will be closely reassessed. At that time, should there be a consensus that weather will not be acceptable, then the launch attempt could be postponed another 24 hours. If a go for tanking is given, it will begin at 10:00 p.m. The launch window opens on Sunday at 7:30 a.m. EST and once again extends for

approximately 7 minutes. The mission duration is slightly longer, changing to 8 days, 5 hours, 3 minutes. Based on an on-time liftoff, landing would occur at KSC on Nov. 20, at 12:34 p.m. EST. The docking of **Atlantis** with MIR occurs at approximately 1:27 a.m. on November 15. Undocking occurs at approximately 3:16 a.m. on November 18. The STS-74 crew has returned to the astronaut quarters and is maintaining a sleep cycle

which coincides with that of the MIR cosmonauts. ["Launch Forecast," **FLORIDA TODAY**, p. 1A, Nov. 10, 1995; **STS-74 Launch Weather Forecast**, Nov. 11, 1995; **STS-74 STATUS REPORT**, Nov. 11, 1995; Halvorson, **FLORIDA TODAY**, pp. 1A-2A, Nov. 12, 1995.]

November 12:

ATLANTIS LIFTS OFF AT 7:30 A.M.

Clouds threatened to delay the launch of **Atlantis** this morning, but the sharp shooters at Launch Control found a hole in the clouds over Kennedy Space Center and clear weather in Spain; launch came at 7:30 a.m. EST. Launch had already been delayed one day primarily because of weather constraints at the emergency landing sites in Spain and North Africa. The launch window of seven minutes was not long enough to wait for clearing weather. "Patience is a good virtue in this business, and this time it only took one day for a complete turnaround here in the weather," said KSC's Shuttle Program Director **Loren Shriver**, a former astronaut. Docking is planned to occur at 1:27 a.m. on November 15. Before that can occur the Remote Manipulating System [developed by Canada] must be used to install the permanent docking module. [Halvorson, **FLORIDA TODAY**, pp. 1A & 4A, Nov. 13, 1995; Borenstein, **THE ORLANDO SENTINEL**, Nov. 13, 1995.]

November 13:

KSC CONTRACTORS OF THE YEAR

Eight Kennedy Space Center (KSC) contractors received honors at the fiscal year 1995 Contractor Awards Ceremony, hosted by the KSC Small and Disadvantaged Business Council on today at Spaceport USA. EG&G Florida, Inc. was recognized as the large business contractor of the year for their exemplary support of small, small disadvantaged, and women-owned small businesses. EG&G has provided outstanding support of socioeconomic programs over the years. This year was no exception as over 85 percent of their subcontracting dollars went to small businesses.

The following small business contractors were recognized for outstanding contract performance:

Small business contractor - ENSCO, In., [Springfield, VA], for its work in technology evaluation and transition;

Small disadvantaged business contractor - I-NET, Inc. [Bethesda, MSD], the engineering support contractor at KSC;

Woman-owned small business contractor - Priority One Construction of Brevard, Inc. [Titusville, FL], contracted to construct the astronaut crew quarters modifications;

Small business subcontractor - Hydraulic House, Inc. [Orlando, FL], provider of hydraulic components, equipment repair and services to Lockheed Martin Space Operations;

Small business subcontractor - Specialty Maintenance & Construction, Inc. [Lakeland, FL], supplier of fabrication and machining services for McDonnell Douglas Aerospace, Space Defense Systems;

Small disadvantaged business subcontractor - RSDI Environmental, Inc. [Jacksonville, FL], for its environmental consulting, geosciences and technical services to Lockheed Martin Space Operations.

Woman-owned small business subcontractor - Troutman Technical Services, Inc. [Indianapolis, IN], for technical support services to Lockheed Martin Space Operations.

KSC Director **Jay F. Honeycutt** presented each honoree with an engraved plaque. [NASA/KSC Press Releases No. 123-95, Nov. 14, 1995.]

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FURLOUGHS LOOM FOR SOME AT KSC

Nationwide, NASA is furloughing 94 percent of its workforce, according to KSC spokeswoman **Lisa A. Malone**. KSC has 2100 civil servants; a significant percentage will be furloughed. Malone went on to say, "We need to provide a minimum level of security for the flight hardware we've got out here. We'd also be supporting the activities in Shuttle processing to maintain the Shuttle schedule. We would have a significant cost if we shut down Shuttle processing. Workers selected for furlough have been designated "non-essential." [Halvorson, **FLORIDA TODAY**, Nov. 13, 1995; "Several KSC Workers Will Face Furlough," **FLORIDA TODAY**, Nov. 14, 1995; Leusner and Holton, **THE ORLANDO SENTINEL**, Nov. 14, 1995.]

November 18: **LOCKHEED AWARDS; MCCULLEY PROMOTION**

Fourteen Lockheed employees have been named Space Flight Awareness Honorees; they were selected for sustained superior performance, achievements having a special impact on program goals and for developing solutions to problems or methods of improving efficiency. The employees include: **Robert Emerson, Linda Ferris, George Fitzgerald, Charles Fricker, Donald Hoppe, Bill Lewis, John Mullen, Jeff Noble, David Owens, Thomas Reid, James Schick, Rick Serfozo, Richard Welty, and Casey Wood**. Lockheed Martin also announced that former astronaut **Michael McCulley** has been named Director of Launch Site Operations at Kennedy Space Center. McCulley, his wife Jane, and their six children are Cocoa Beach residents. Six employees of Base Operations Contractor

EG&G Florida, Inc., have also been selected as recipients of the Honoree Award; they are: **Benny Lock, John Hedrick, Terry Knudsen, Anita Rudolph, Robin Schaeffer, George Stephenson Jr. and Linda Warren.** In addition, **Roystan King Jr.** [Merritt Island, FL] has been presented with a Silver Snoopy Award by astronaut **Joe Tanner.** King is a lead NASA quality engineer. **Kennedy Aguilar** has been awarded the KSC Director's Award in recognition of his accomplishments in a number of areas, including union management relations at KSC, promotion of a positive and motivating work environment and increasing the quality and diversity of the KSC work force. [**"Quality Engineer Wins Silver Snoopy Award" and "KSC Director's Award Goes to Policy Chief," FLORIDA TODAY, Nov. 12, 1995; "Space Newspapers: Former NASA Astronaut Gets Promotion at Lockheed," FLORIDA TODAY, Nov. 19, 1995.**]

November 20: MORGAN INDUCTED INTO WOMEN'S HALL OF FAME

Kennedy Space Center Senior Manager and space program veteran **JoAnn Morgan** joins 36 prominent Florida women whose achievements have earned them induction into the Florida Women's Hall of Fame. "We are committed to recognizing women of extraordinary achievement from all walks of life," noted Women's Hall of Fame Committee Chairperson **Doris Weatherford.** She also is historian for the Florida Commission on the Status of Women [FCSW], which annually submits a short list of nominees to Governor **Lawton Chiles** for final selection. The induction ceremony took place November 13 at the new Women's Hall of Fame Wall in the Capitol Rotunda at Tallahassee, where Morgan's photograph and a list of her accomplishments will be added to the displays. Gov. Chiles spoke of Morgan's contributions to the space program during the formal induction, attended by a number of state officials. Two other Florida women were inducted along with Morgan. [NASA/KSC Press Release No. 125-95, Nov. 20, 1995.]

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STS-74 ENDS WITH FLAWLESS LANDING

Atlantis touched down on the Shuttle Landing Facility's runway at 12:02 p.m. today, concluding an eight day mission which saw the second docking with the Russian **Mir** Space Station. Mission Control's communicator, astronaut **L. Blaine Hammond,** greeted the STS-74 crew upon landing, saying in Russian, "Welcome back to Earth. Congratulations to you for the successful completion of the flight." **Atlantis** Commander **Kenneth D. Cameron** said, "We helped build some bridges between people and between space programs." The primary goal of the mission had been to secure a 15-foot tunnel to the **Mir** as a permanent berth for future Shuttle flights to the station, including the three planned for next year. "I think it turned the **Mir** station into a routine Shuttle docking facility," said **Tommy Holloway,** Shuttle Program Director. Looking back over the flights of 1995, **Robert B. Sieck,** Director of Shuttle Launch Operations at Kennedy Space Center, said. "Every year has its minor things that are new and challenging that the launch team has to accommodate. If you look at the results, it's been a great year. The toughest thing is the furlough we're dealing with now, coming on top of the specter

of budget cuts down the road." [Cabbage, **FLORIDA TODAY**, pp. 1A-2A, Nov. 19, 1995; Borenstein, **THE ORLANDO SENTINEL**, Nov. 20, 1995; Cabbage, **FLORIDA TODAY**, Nov. 20, 1995.]

November 21:

SHUTTLE SCHEDULE UPDATE

The Space Shuttle **Endeavour** is presently undergoing pre-rollover processing for its STS-72 mission in Orbiter Processing Facility Bay 3. Final payload bay door closure is planned for November 22 with rollover to the Vehicle Assembly Building set for November 29. Rollout to Launch Complex 39B is targeted for December 5. In OPF Bay 2, workers are processing **Columbia** for its first mission next year - STS-75. The eldest vehicle will carry Tethered Satellite 1R and USMP-3 into space. The planned launch date is February 22, 1996. Tomorrow OPF workers will complete removal of **Columbia**'s main engines, make functional checks of the forward reaction control system on November 27 and begin the removal of onboard cryogenic storage tank set no. 2 on November 28. **Atlantis** is being processed for STS-76, the third Mir Docking Mission, in OPF Bay 1. Workers there are conducting post-STS-74 flight inspections. They are destowing mission specific items, preparing to offload residual reactants for the power reactant storage and distribution system. The Bay 1 work force is also making preparations for drying the main engine high pressure fuel pumps and for the trickle purge of the orbital maneuvering system. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, Nov. 21, 1995.]

November 21:

SOHO LAUNCH READY

"The launch vehicle is ready to go. We're just getting through the usual closeouts" on technical matters, commented Lockheed Martin spokeswoman **Julie Andrews**. She referred to Thursday morning's launch of an Atlas rocket which will carry the Solar Heliospheric Observatory Satellite to its mission to study the Sun's atmosphere, solar winds and interior. The mission is to last two years and will utilize a dozen onboard telescopes and instruments. Scientists are especially interested in the huge clouds of gas periodically emitted from the Sun and which envelop the Earth. "They can disturb the Earth's magnetic fields, and in doing so, they can cause significant disruptions to our communications systems, our navigation systems, our power distribution systems and our ability to control satellites," said scientist **Richard Harrison**, who is working on the SOHO mission. [Cabbage, **FLORIDA TODAY**, Nov. 22, 1995; Cabbage, **FLORIDA TODAY**, Nov. 24, 1995.]

November 22:

SHUTTLE STATUS REPORTS

At Kennedy Space Center, workers have closed the payload bay doors of **Endeavour** for its STS-72 mission set for January 11. The mission will retrieve the SFU and deploy the OAST Flyer. **Endeavour** will be rolled over to the Vehicle Assembly Building on November 29 with rollout to Launch Complex 39B targeted for December 5. The STS-

72 terminal countdown demonstration test will occur December 11-12 followed by a flight readiness review planned for January 4. In OPF Bay 2, workers are preparing **Columbia** for its STS-75 mission, currently targeted for February 22. The three main engines of **Columbia** have been removed. Functional checks of the forward reaction control system are set for November 27 and removal of the onboard cryogenic storage tank set no. 2 is planned for November 28. Finally, the Space Shuttle **Atlantis**, having just returned from its second docking mission with Mir, the Russian Space Station, is now being prepared for its third such mission - STS-74. The vehicle is in OPF Bay 1 where post-flight inspections [STS-74] are underway along with destowing of STS-74 mission specific items. Preparations are underway for the trickle purge of the orbital maneuvering system. Workers have dried the main engine high pressure fuel pumps and have offloaded residual reactants from the power reactant storage and distribution system. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Nov. 22, 1995.]

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ATLANTIS RETURNS IN GOOD SHAPE

"The Orbiter fared very well. And that definitely will make things smoother in the turnaround for the third Mir docking mission," said Kennedy Space Center spokeswoman **Lisa A. Malone** of the recently returned **Atlantis**. The vehicle's initial inspection uncovered 116 small gouges in the 25,000 tiles of the thermal protection system. **Atlantis** landed at KSC on November 20. **Endeavour** has been in the Orbiter Processing Facility and is being readied for its STS-72 mission scheduled for January 11. Next week **Endeavour** will be rolled over from the OPF to the Vehicle Assembly Building for mating with its solid rocket boosters and external tank. [Halvorson, **FLORIDA TODAY**, Nov. 23, 1995.]

November 25:

PLAN TO TRIM WORKFORCE

NASA's review of its management and workforce suggests that civil servants in NASA would number 17,500 by 2000, the lowest it has been since 1961. Another 25,000 contractor jobs will be eliminated. The Kennedy Space Center recommendations emerging from the review include:

- *Shuttle operations would be consolidated under a single contractor.

- *KSC will assume management of Atlas-class expendable launch vehicles from Lewis Research Center.

- *Job impact by the year 2000: loss of 1,150 civil servants; loss of 2,000 contractor personnel. ["Agency Outlines Scope of Plan to Trim Workforce," **FLORIDA TODAY**, Nov. 26, 1995.]

November 27:

STS-72 PROCESSING UPDATE

Aft main engine compartment closeouts have been completed in preparing **Endeavour** for its January 11 STS-72 mission. Today, workers are conducting landing gear and associated hydraulic systems testing and reverification. They are also making Orbiter aft main engine compartment leak checks, Orbiter structural leak checks, crew compartment leak checks and removing the payload bay door strongback. Scheduled STS-72 work: weight and center of gravity determination; rollover to the Vehicle Assembly Building and rollout to Launch Complex 39B on December 5. **Columbia's** three main engines have been removed. Work begins today to remove and replace **Columbia's** window No. 6 for its February STS-75 mission. The forward reaction control system will be removed on November 28; in addition, the freon coolant loop No. 1 will be deserviced and testing will begin on the Ku-band antenna. In the Operations and Checkout Building, work on the STS-75 payloads - Tethered Satellite and USMP-3 - has been going smoothly and is nearing completion. They will be moved into the Cargo Integrated Test Equipment [CITE] stand later this week in preparation for final testing. **Atlantis** is recently returned from its STS-74 mission on which it docked for the second time with the Russian Mir Space Station. Located in OPF Bay 1, workers have established post-flight access inside **Atlantis**. The payload bay doors are being opened today in preparation for removing the Orbiter Docking System [ODS] on December 1. The STS-74 Orbiter and solid rocket booster post-flight data analysis is complete with no issues or concerns remaining. [KSC SPACE SHUTTLE STATUS REPORT, Nov. 27, 1995.]

November 27:

ATLAS: FAULTY FUEL REGULATOR

A billion dollar mission to study the sun was put on hold today when manufacturer Rocketdyne discovered that a faulty fuel regulator had been made of the wrong material. "It's a good thing it failed when it did," said NASA spokesman **George H. Diller**. "It had the potential to cause loss of the mission." Investigators found that the regulator had been made of a much weaker plastic than the mylar plastic from which it should have been made. Since the initial discovery, another faulty regulator has been discovered in the Atlas rocket. Rocketdyne spokesman **Paul Sewell** said, "We're checking out every engine. It's kind of a paper chase to see which regulators went on which engines." Another Atlas rocket was expected to be launched on December 14 and it, too, has been delayed. [Cabbage, **FLORIDA TODAY**, p. 1A, Nov. 28, 1995.]

November 28:

DELTA LAUNCH DELAYED: PROBLEMS

A problem has arisen with an actuator on the first stage of a Delta rocket which had been scheduled for launch originally on December 6; that launch date has now been postponed till December 10. The problem was detected November 25 during a test. The actuator's job is to move the engine to guide the rocket's course in flight. "They're [actuators] used to control roll during the first stage," said **Keith Takahashi**, a spokesman

for the rocket's manufacturer McDonnell Douglas. "Fortunately, the problem cropped up early." Technical problems with two Atlas rockets have also occurred and caused a reshuffling of the Cape Canaveral Air Station's launch schedule for next month. [Cabbage, **FLORIDA TODAY**, Nov. 29, 1995.]

November 30:

ATLAS/SOHO RESCHEDULED

The Atlas IIAS, designated AC-121, has been cleared for launch of the SOHO spacecraft Saturday, December 2, with a 51-minute window that opens at 2:34 a.m. EST. The precision reference regulators on the Atlas booster and sustainer engines have been replaced and checked out, and the vehicle and spacecraft are ready for flight. The final flight readiness review was successfully conducted this afternoon by NASA, ESA and Lockheed Martin. The first launch attempt for the SOHO mission, scheduled for 1:54 a.m. EST, November 23, was scrubbed late on November 22 due to a malfunction in the Atlas booster precision reference regulator. The decision to scrub occurred at the T-minus-148-minute readiness report for service tower removal. It was determined during normal prelaunch monitoring that the regulator had shifted to well below its normal operating pressure control level. If booster precision regulator reference pressure is lost in flight, the thrust of the booster engines is throttled to about 60 percent of normal thrust. If a thrust decay of this magnitude occurred early in flight, it would compromise the success of the mission. However, if it occurred late in booster flight, a thrust decay of this magnitude could be tolerated and the mission successfully completed. Following the late-night scrub on November 22, the regulator was removed and returned to Rocketdyne Division of Rockwell, builder of the Atlas engines, for failure analysis, November 23. The failure analysis determined that a diaphragm in the control section of the regulator had ruptured, which led to the pressure shift observed during the prelaunch period. Further analysis of the cause of the rupture showed that the diaphragm had been manufactured from incorrect material. As specified by the released engineering, the diaphragm consists of four layers of mylar. The failed diaphragm was made of four layers of polyvinyl fluoride [PVF], which has about one-half the burst strength of mylar.

A "fishbone analysis," a rigorous cause and effect methodology used by Lockheed Martin to investigate vehicle anomalies, verified that the improper material was the cause of the malfunction. The PVF plastic film material, through an isolated instance of human error, was inadvertently substituted for the specified mylar material by a component supplier. Quality procedures have been tightened to prevent a recurrence. Rocketdyne has completed a survey to identify any other regulator controllers manufactured with improper diaphragm material, and those identified are being reworked. All regulators used on subsequent Atlas flights will follow the same controller diaphragm material confirmation and regulator functional verification process used to return AC-121 to flight readiness. Additionally, other similar applications of plastic films and flight critical Atlas and Centaur components have been examined to verify that proper material certification tests and controls are in place and are being properly

followed. To return AC-121 to flight readiness, two controllers with the proper material were identified for use in the booster and sustainer precision reference regulators. Both regulators were rebuilt, functionally checked out and hot-fire tested on a flight engine at the Rocketdyne Santa Susana test facility in California prior to shipment to Cape Canaveral. They were installed on AC-121 on November 29 and normal regulator checkout was performed according to prelaunch procedures. The vehicle was refueled with RP-1 earlier today in preparation for launch Saturday morning. During the launch window from 2:34 a.m. to 3:25 a.m. there will be scattered clouds, light and variable winds, and a temperature in the upper 50's. The chance of launch weather rule violation is 0 percent. [EXPENDABLE VEHICLE STATUS REPORT, Nov. 27, 1995; LAUNCH ADVISORY: ATLAS/SOHO LAUNCH SCHEDULED FOR DECEMBER 2, Nov. 30, 1995; Cabbage, FLORIDA TODAY, Dec. 1, 1995; Holton, THE ORLANDO SENTINEL, pp. A-1 & A-19, Dec. 1, 1995.]

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FINAL PREPARATIONS FOR ENDEAVOUR

Endeavour is being prepared for its planned rollover to the Vehicle Assembly Building. KSC spokesman **Bruce Buckingham** said, "It looks very good right now. There aren't any big issues being addressed that will keep us from launching on schedule." Launch is planned for 4:18 a.m. EDT on January 11 and will be the first of eight Shuttle launches in 1996. The STS-74 crew includes Commander **Brian Duffy**, Pilot **Brent Jett** and Mission Specialists **Leroy Chiao**, **Winston Scott**, **Daniel Barry** and **Koichi Wakata**. In Congress, meanwhile, legislation to fund NASA was sent back to committee with instructions to add \$213 million for veterans health care programs. Appropriations for both NASA and the Department of Veterans Affairs are handled in the same legislation. [Cabbage, FLORIDA TODAY, p. 2A, Nov. 30, 1995.]

DECEMBER

December 2:

ATLAS LIFTS SOHO TO SOLAR MISSION

An Atlas rocket lifted off this morning at 3:08 and delivered the SOHO satellite to its mission to study the sun. SOHO [or Solar Heliospheric Observatory] will travel 930,000 miles to study the sun's effects on Earth. "It's been a long time, but the scientists are really excited," according to Goddard Space Flight Center spokesman **Jim Sahli**. "It's going to be the largest solar observatory since Skylab." The mission itself, is a joint project of NASA and ESA [European Space Agency]; the satellite is European-built and will be operated from GSFC. Earlier, a similar joint venture between ESA and NASA launched the Ulysses spacecraft which is currently on a mission to study the sun's polar regions and the solar wind. ESA is providing 55 percent of the funding for the mission. **Simon Vermeer**, an ESA spokesman, commented. "The sums of money are so great one country can't do it anymore. It's not just a matter of choice, it's a necessity." [Cabbage, **FLORIDA TODAY**, Dec. 3, 1995.]

December 3:

WORKERS READY ENDEAVOUR

The Space Shuttle **Endeavour's** next launch - STS-72 - is planned for January 11, 1996, but workers at Kennedy Space Center are reading the Orbiter for rollout to the launch pad on December 6. Over the weekend, workers mated the vehicle to its external tank and solid rocket boosters. KSC management hope to have the Orbiter all but ready to launch when the space center's work force returns from the Christmas/New Year holidays. The six-member crew will arrive December 10 to take part in the terminal countdown demonstration test starting on December 11. The STS-72 mission will be the first of eight scheduled for 1996. [KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT, Nov. 21, 1995; Cabbage, **FLORIDA TODAY**, p. 4A, Dec. 4, 1995.]

December 7:

KSC BENEFITS FLORIDA ECONOMY: \$1.31 BILLION

Space related employment and contracts at NASA's Kennedy Space Center yielded a \$1.31 billion boost to Florida's economy during the 1995 fiscal year which ended September 30. This figure represents \$1.18 billion in Florida contracts and purchases along with \$126.5 million in civil service and personnel compensations. Approximately ninety-five percent of the Florida dollars or \$1.12 billion was expended within Brevard County. Of KSC's total expenditures, \$1.11 billion went to contractors operating on-site at the space center. An additional \$12.6 million went to off-site businesses in Brevard County, while \$57.1 million was awarded to Florida businesses outside the county. Out-of-state purchases totaled about \$64 million. Furthermore, KSC exceeded its socioeconomic goals, established by the Small Business Administration, by awarding over \$73 million in contracts to small, disadvantaged and woman-owned businesses. Permanent federal employees at KSC totaled 2,272 during fiscal year 95. While 1,999

people were employed through construction and tenant jobs at KSC, the majority of the workers were employed by the on-site contractors and numbered almost 10,551. Overall, approximately 14,822 workers were employed at KSC through the close of the fiscal year on September 30. [NASA/KSC News Release No: 128-95, Dec. 7, 1995.]

December 8:

STS-72 CREW ON HAND FOR TCDT

The six-member STS-72 crew will arrive at KSC Sunday [December 10] to take part in the mission's terminal countdown demonstration test [TCDT]. The crew will be available to the press until Tuesday morning when, with three hours remaining in the TCDT, they enter the cabin of **Endeavour** to complete the test. The mock countdown culminates with a simulated main engine cut-off at 11 a.m. **Endeavour** is now targeted for launch on January 11. The first mission of 1996, STS-72 will feature the retrieval of the Japanese Space Flyer Unit which was launched March 18, 1995, aboard a Japanese H-2 rocket. Crew members for mission STS-72 are: Commander **Brian Duffy**; Pilot **Brent Jett**; and Mission Specialists **Leroy Chiao**, **Daniel Barry**, **Winston Scott** and **Koichi Wakata**, a Japanese astronaut representing NASDA, the Japanese Space Agency. [NASA/KSC News Release No: 130-95, Dec. 8, 1995.]

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BREVARD IMPACTED BY SHUTTLE CUTBACKS

Brevard County will be impacted by expected cuts in the Shuttle Program to the extent of some \$50 million; in FY 1995, the county was benefited by \$1.2 billion. "We will continue to be one of the major economic forces in Brevard County," said KSC spokeswoman **Lisa A. Malone**. "We're not doing any less work. We're just leaner and working smarter." **Linda Weatherman**, President of the East Economic Development Commission of East-Central Florida, commented: "NASA has said in their budget hearings that they'll be doing more with less. Now it's just showing up in the numbers." [Halvorson, **FLORIDA TODAY**, p. 2A, Dec. 8, 1995.]

December 10:

SECOND DELTA LAUNCH TRY SET

High winds scrubbed yesterday's attempt to launch a McDonnell Douglas Delta carrying a NASA astronomy satellite. Air Force meteorologists predict only a ten percent of a weather violation on today's second attempt to launch the X-Ray Timing Explorer mission. Meanwhile, a terminal countdown demonstration test was underway at Kennedy Space Center for the upcoming STS-72 mission of **Endeavour**. On that mission, astronaut **Koichi Wakata** will be in charge of retrieving a Japanese satellite for a return to Earth. The remainder of the crew includes Commander **Brian Duffy**, Pilot **Brent Jett** and Mission Specialists: **Leroy Chiao**, **Winston Scott** and **Daniel Barry**. [Halvorson, **FLORIDA TODAY**, p. 1A, Dec. 10, 1995; Halvorson, **FLORIDA TODAY**, p. 1B, Dec. 12, 1995.]

December 11:

PAYLOAD CONTRACT EXTENDED

NASA's Kennedy Space Center, FL, has awarded McDonnell Douglas Aerospace, Space & Defense Systems, a one-year extension to its existing contract for payload ground operations services. The value of this option is \$152. This extension is effective January 1, 1996, and ends December 31, 1996. The contract features options that will carry the contract period of performance through December 31, 2001, and will bring the total contract to \$2.2 billion. This is the third extension of the payload ground operations contract awarded to McDonnell Douglas since the original contract was initiated in January 1987. Under the cost-plus-award-fee contract, McDonnell Douglas will continue to provide ground support, test and integration for payload operations at the Kennedy Space Center. [NASA/KSC Press Release No: C95-s, Dec. 11, 1995.]

December 14:

NEW KSC NEWS CENTER OPENS

A ribbon cutting ceremony officially celebrates the opening of KSC's new News Facility, located in Launch Complex 39. The event takes place at the doors to the new facility. **Laurie Boeder**, Associate Administrator of NASA Public Affairs; **Jay F. Honeycutt**, Kennedy Space Center Director; **Hugh Harris**, KSC Public Affairs Director; and **Frank Durso**, Facilities Engineering and Project Management participated. The new facility is a permanent building replacing the geodesic dome. The facility houses NASA Public Affairs and contractor employees and provides working space for the news media. In addition, this facility features libraries from which official NASA video tapes, audio tapes, still photos and printed materials are provided to the news media. [NASA/KSC Press Releases No: 131-95, Dec. 12, 1995.]

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SUCCESSFUL ATLAS LAUNCH

"This is the most fantastic way to end the year I can think of," said Lockheed Martin spokeswoman **Julie Andrews** of the successful launch of an Atlas rocket at 7:23 p.m. The rocket delivered to orbit a Hughes Communications' Galaxy 3-R satellite. The rocket's performance was described as "flawless," by company officials. Hughes Space and Communications Company spokeswoman **Fran Slimmer** said, "It's going to be the first satellite that will serve two continents [Central & South America] for Hughes. This satellite is the state of the art right now." The launch was a record 11th from Cape Canaveral Air Station this year. [Cabbage, **FLORIDA TODAY**, p. 2A, Dec. 15, 1995.]

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WELDON: TREATY MAY HURT BREVARD

A new treaty will limit Brevard County's chances of competing for the 120 commercial launches expected by 2001, according to Rep. **Dave Weldon** [R-Melbourne, FL]. **Ed Ellegood**, Operations Director for Spaceport Florida, added that "this treaty is a wake-up call to Cape Canaveral Air Station. We have to cut costs to become more competitive...." The treaty gives countries such as Ukraine a license to bid on five

77commercial launches and additional joint ventures. Ukraine's government subsidizes commercial ventures through the provision of capital resources. Opponents of the treaty see this as anti-competitive and disadvantageous to American space business interests. The fact that under circumstances U.S. companies would be called in to consult on launch ventures does not "comfort me," said Congressman Weldon. He added, "The only effect of the treaty is to bring more jobs to Boeing in California. I see no opportunity for commercial launches on the Space Coast." [Reid, **FLORIDA TODAY**, p. 2A, Dec. 15, 1995.]

December 20:

SECOND GOVERNMENT SHUTDOWN

The second federal government shutdown in a month has canceled a briefing at Ames Research Center on the Galileo probe's dive into Jupiter's atmosphere on December 7. The probe is the first human-made device ever to sample the composition of one of the giant gas planets of the solar system. Deputy Mission Director **Matt Landano** said, "We don't know if the probe died then [on entering Jupiter's crushing atmosphere]. We have evidence that all the instruments worked properly. They all provided data throughout the descent." Landano expressed confidence that the probe's recorder worked properly after initially giving some problems. "We did not see any evidence of any problems with the recorder," he said. "We will begin the playback of the probe data from the recorder in late January or early February." Compared to the six years of travel time from Earth to Jupiter, the government shutdown should be relatively brief. "People are just very relieved," said JPL spokeswoman **Mary Beth Murrill**. "A lot of the Galileo people are looking forward to taking a vacation for the first time in a long time." [Cabbage, **FLORIDA TODAY**, p. 1A, Dec. 20, 1995.]

December 29:

DELTA NEARS SCRUB RECORD: 6

Weather may cause the launch of a Delta rocket to be scrubbed for a record sixth time today. There is a 60 percent chance that weather will be favorable for liftoff, but there are strong winds - between 17 and 29 mph - from the north which may yet prevent the launch; mission rules require winds to be 25 mph or less. Air Force Major **Ingrid Bradley** indicated that weather was expected to improve Saturday [December 30]. The Delta's cargo is the X-Ray Timing Explorer, a spacecraft designed to study X-Ray emissions from black holes, pulsars, quasars and other celestial objects. [Halvorson, **FLORIDA TODAY**, p. 1A, Dec. 29, 1995.]

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